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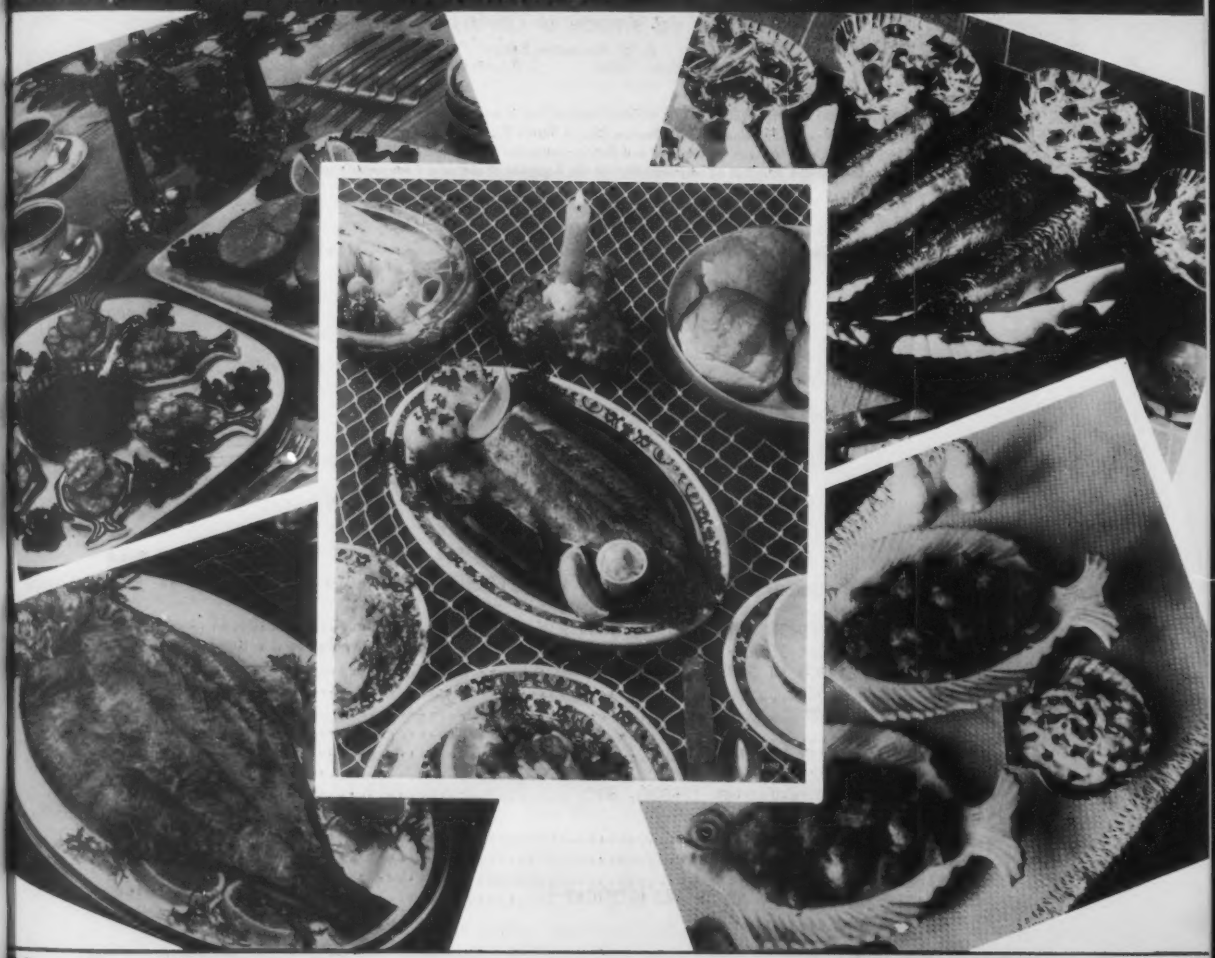

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United States Department of the Interior
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UNITED STATES
DEPARTMENT OF THE INTERIOR
HAROLD L. ICKES, Secretary

FISH AND WILDLIFE SERVICE
IRA N. GABRIELSON, Director

COMMERCIAL FISHERIES REVIEW

A REVIEW OF DEVELOPMENTS AND NEWS OF THE FISHERY INDUSTRIES
PREPARED IN THE DIVISION OF COMMERCIAL FISHERIES
A. W. Anderson, Editor
F. F. Johnson, Associate Editor C. R. Lucas, Assistant Editor

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CONTENTS

Cover: See page 19

	Page
IMPORTED FISH: A MAJOR NEW ENGLAND PROBLEM, by William C. Herrington	1
A plan for control of fish imports is proposed.	
THIAMINE ASSAYS OF FISHERY PRODUCTS, by Philip M. Sautier	17
The thiamine content of a wide range of fishery products and byproducts is analysed.	
TECHNOLOGICAL RESEARCH IN SERVICE LABORATORIES	20
FRESH AND FROZEN FISH	22
CANNED AND CURED FISH	27
FISHERY BYPRODUCTS	29
OTHER NOTES ON FISHERY MARKETING	30
FOREIGN FISHERY TRADE	33
FEDERAL LEGISLATION, DECISIONS, ORDERS, ETC.	40
Office of Price Administration:	
Price Controls Relaxed	40
Norwegian Sardines	40
RECENT FISHERY PUBLICATIONS	41
WHITEFISH FISHERY OF LAKES HURON AND MICHIGAN	Outside back cover

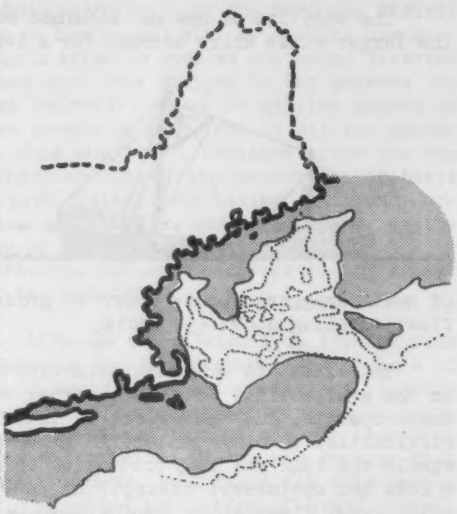
COMMERCIAL FISHERIES REVIEW

February 1946 Washington 25, D. C. Vol. 8, No. 2

IMPORTED FISH: A MAJOR NEW ENGLAND PROBLEM[1/]

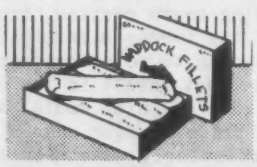
By William C. Herrington *

The New England fishing industry during the last three years has experienced numerous dislocations and restraints as the result of war-created shortages and regulations. In spite of these difficulties, production has been restored to and beyond the pre-war peak. Many of these shortages and regulations now are being eased, and it should not be long before most of their accompanying headaches are eliminated. Price ceilings, the source of possibly the biggest headaches, probably will remain for some time.



When the general food situation improves to the point where the supply of fish equals or exceeds demand, we should be rid of price ceilings; but with this change from a shortage economy the industry will enter a new period, with problems as serious as those faced during the war. Probably the greatest of these problems will be the readjustments within the industry that will be required when fish must once more face the competition of adequate supplies of other foods, such as meat, cheese, and eggs, as well as greatly increased competition from foreign fish. Before discussing this problem in greater detail, it will be well to review some of the relevant developments in the New England industry.

PRODUCTION OF NEW ENGLAND FISH: The New England fishing industry supplies a large proportion of the fresh and frozen fish produced in the United States. In 1944, New England ports accounted for over 500 million pounds of fresh and frozen finny fish, about 50 percent of the country's total production. Prior to 1938, the bulk of the production was landed at Boston, but since that date, Gloucester and New Bedford landings have increased spectacularly. By 1941, the combined landings at Boston, Gloucester, New Bedford, and Portland had reached 520 million pounds, which made up about 80 percent of the New England total of fresh fish (omitting herring, alewives, and shellfish). This was about 75 million pounds more than was produced in any previous year and was made possible by the increase in the fleet of otter trawlers and the expanded markets resulting from the European war.



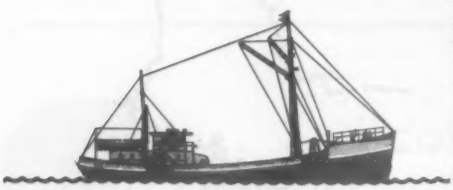
1/ This article, which represents the author's personal viewpoint, is published because of the current interest in problems associated with importation of fresh and frozen fishery products. It is not intended as a statement of the official policies of the United States Government.

* Biologist, Division of Fishery Biology. This study was made and the article prepared while the author was serving as Area Coordinator in the Office of the Coordinator of Fisheries.

During the next two years (1942 and 1943), the catch dropped about 25 percent from the 1941 level, primarily because of reductions in the fishing fleet, resulting from the leasing and sale of many of the best boats to the Government. Curtailed operations resulting from strikes against price ceilings combined with the reduction in the size of the fleet, caused production during the winter of 1943-44 to drop to the lowest level since 1934.

The expanded boat-building program administered by the Office of the Coordinator of Fisheries began turning out medium and small draggers in considerable numbers during the latter part of 1943, and by the summer of 1944 these boats, together with boats returned by the Armed Forces, had increased the fleet's potential producing capacity to a level approaching the record 1941 production. However, these medium and small boats were not capable of maintaining production during the stormy winter months or of fishing the more distant grounds. Consequently, although the summer landings rose to within about 10 million pounds of the 1941 level, the total for the year was about 80 million pounds below the record 1941 catch.

The addition of new and returned boats to the New England fleet, particularly the larger sizes which account for a large share of the production, has continued at an increasing rate since the summer of 1944. By midsummer of 1945, the fleet of large trawlers, boats over 150 gross tons, totaled about 50, compared to 24 during the summer of 1943 and an average of about 40 in 1941. The fleet of medium draggers, boats between 50 and 150 gross tons, had increased to nearly 190 boats, compared to about 100 in the summer of 1943 and less than 125 in 1941. The increase in the fleet of small draggers, boats under 50 gross tons, was equally spectacular, the 1945 fleet totaling about 650 boats.



The extent to which the catch will be increased by this enlarged fleet depends on the availability of fish, weather conditions, the regularity with which the boats operate, and the extent of interruptions in fishing resulting from labor difficulties or other causes. If we assume that the production of individual boats equals the 1942 and 1943 production of boats of similar sizes (in all probability a much too optimistic assumption), during the 12 months from July 1945 on, the otter trawl fleet alone should produce nearly 600 million pounds of fish. This would be an increase of about 250 million pounds over the reduced catch in 1943 and would even exceed, by a considerable margin, the record landings in 1941.

The above summary covers only the New England boats which will be available by midsummer of 1945. Although the boat-building program has slackened considerably in the last few months, some activity continues; and it can be expected that as the demands for war materials decrease and boat-building costs decline, there will be increased building of new boats, particularly of the larger sizes, which will make use of new ideas in design and construction leading to more economical and efficient operation. The competition from these boats must result in the decommissioning of many of the older semi-obsolete boats, some of which would have been retired long before except for the abnormally high price of fish caused by war-created food shortages. The "squeeze" will be particularly severe on the smaller boats which are not able to shift their fishing operations to the more distant fishing grounds when competition for fish becomes increasingly severe on the nearby banks. This greatly increased fishing intensity also will reduce the stocks of spawning fish and young fish to much less productive levels, thus making the situation of the dragger fisherman even worse, unless the industry makes sure that suitable measures are taken to safeguard these stocks of fish.

The developments which have been outlined above are bound to result in greatly increased competition within the industry, and this should stimulate the development of more efficient and economical producing and processing methods. If high natural reproduction of the stocks of fish, particularly of those on the nearby

grounds, can be maintained by intelligent conservation measures, the result of these developments during the post-war period of readjustment would be that the fishing industry will be in a favorable position to compete with other food-producing industries for the housewife's favor. However, it is not necessary to look very far ahead to see that another element, imported fish, is entering the competitive picture on a scale which, insofar as the fresh and frozen fish trade is concerned, may make competition within the industry for markets a matter of secondary importance.

COMPETITION FROM FOREIGN FISH: Our neighboring countries to the North and East, traditionally are great producers of fish. Nova Scotia produces annually over 200 million pounds of cod, in addition to millions of pounds of haddock and other species; Newfoundland produces annually over 500 million pounds of cod and other species, while Iceland, Greenland, and other North Atlantic countries have produced and can produce billions of pounds of fish. In the past, much of their catch has been salted and disposed of in markets outside of the United States. Since the beginning of the war, these countries have greatly expanded their production of frozen fillets to feed English and other European populations deprived of their normal supply of fresh fish. With the restoration of the European fishing fleets, this fish no longer will be needed in Europe and will be seeking new markets. Already, increasing quantities of North Atlantic species are being diverted to this country. During the last four years they have shipped to our markets the following amounts (in terms of weight when landed): about 26 million pounds in 1941, 45 million pounds in 1942, 48 million pounds in 1943, and 65 million pounds in 1944. It is reasonable to expect that this trend will continue after the war and that these countries will seek to divert an increasing proportion of their total production to our markets as frozen fish. With lower living costs and Government-assisted production (subsidized boats, shore plants, and distributing equipment), they can produce an enormous quantity of processed fish at prices which will completely demoralize the North Atlantic fishing industry and drastically affect the fishing industry in other sections of the country.

COMPETITION FROM OTHER PROTEIN FOODS: Although competition from foreign fish will be one of the biggest post-war problems of the New England, and perhaps of the entire United States fishing industry, it would be a serious mistake to think of the post-war situation solely in these terms. The approximately one-billion-pound market for fresh and frozen fish which existed before the war cannot be considered in any way as a fixed market for which United States and foreign fish must compete. Fish as a product, regardless of origin, must fight for this market against strong competition from the greatly expanded production of other protein

Table 1 - U. S. Production of Meats, Cheese, and Eggs[1/]
(In millions of pounds)

Year	Cattle and Calves	Hogs	Sheep and Lambs	Chickens	Eggs[2/]	Cheese	Total
1930	13,262	15,176	1,965	2,643	4,780	567	38,393
1931	13,401	16,541	2,050	2,457	4,710	555	39,714
1932	14,191	16,368	1,831	2,576	4,440	545	39,951
1933	15,370	16,566	1,863	2,616	4,340	565	41,320
1934	14,504	12,386	1,921	2,215	4,210	612	35,848
1935	13,651	10,673	1,835	2,313	4,110	669	33,251
1936	14,438	12,976	1,849	2,410	4,220	687	36,580
1937	13,746	12,506	1,938	2,042	4,590	712	35,534
1938	14,047	14,372	2,042	2,185	4,570	759	37,975
1939	15,098	17,082	2,041	2,338	4,750	774	42,083
1940	15,583	17,043	2,112	2,093	4,840	791	42,462
1941	16,718	17,473	2,267	2,477	5,100	790	44,825
1942	17,967	21,054	2,332	2,807	5,910	837	50,907
1943	18,419	25,544	2,136	3,410	6,630	663	56,802

1/From 1944 Agricultural Statistics.
2/Egg production converted to pounds on the basis of 1-1/3 lb. per dozen.

foods such as meat, cheese, and eggs. Production of these products in 1943 was more than 14 billion pounds greater than in 1940. (See Table 1 above and Figure 1, p. 4.) Under favorable conditions, the one-billion-pound market for fresh and frozen fish might be expanded until it was great enough to absorb the growing United States production, in addition to large quantities of foreign fish. Under un-

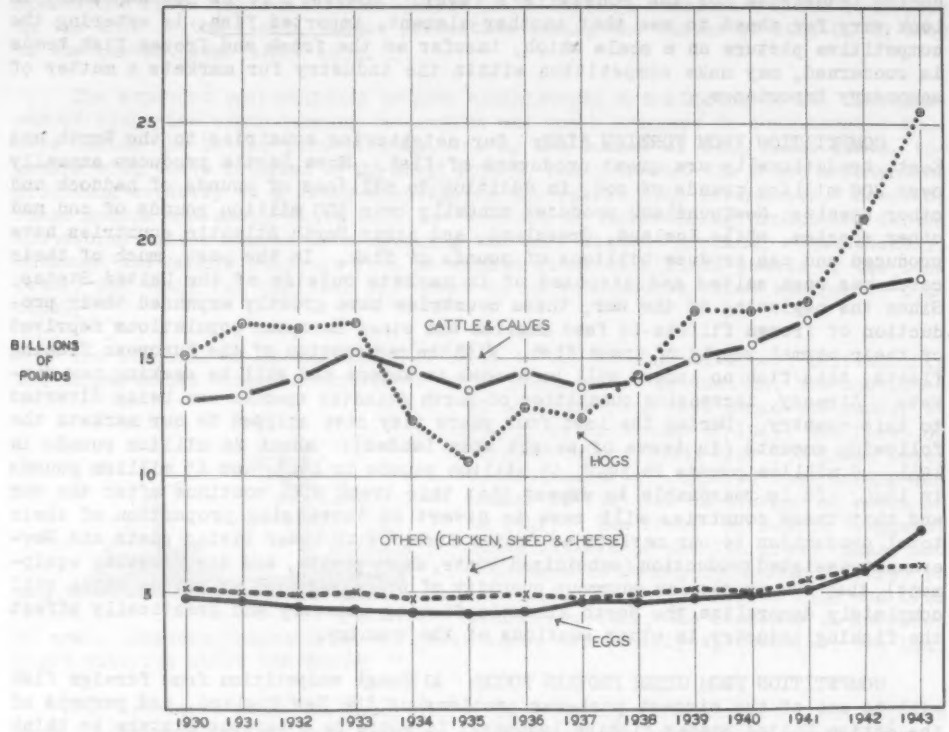


FIGURE 1 - TOTAL U.S. PRODUCTION IN POUNDS OF VARIOUS ANIMAL PROTEIN FOODS COMPETING WITH FISH.

favorable conditions, it may shrink until any sale of foreign fish is directly at the expense of long established fish producers in the United States. It is the business of the United States industry to see that conditions do not force the last alternative.

The amount of fresh and frozen fish that will be marketed in this country during the next decade will depend on many things, but probably, most of all, on the quality and price. With many other kinds of food competing for the consumer's dollar in the post-war markets, the quality of the fish must be high and the price reasonable if we are to market the quantity of fish which will be available after the war.

The importance of price (relative price) on the volume marketed can be shown by comparing the price as well as the production of fish during past years, with the price of competing protein foods. Those foods generally thought to compete most directly with fish are meat, cheese, and eggs. In order to determine the relationship between the price of these competing foods and the price and production of fish, the prices of beef cattle, hogs, and eggs were obtained from various Government reports, and compared with the price and production of cod and haddock. The degree of relationship was measured statistically by the correlation coefficient r. A summary of the results is given in Table 2 (see p. 5), while the data used are given in Table 3 (see p. 13) in the APPENDIX. The r values simply represent the closeness with which the variations in the compared items are associated, with

r = 1.00 representing perfect positive correlation, r = 0.00 representing no correlation, and r = -1.00 indicating a perfect negative correlation. A more complete discussion of the methods and data used is given in the APPENDIX.

Table 2

A - Correlations Between the Annual Price and Production of Certain Animal Protein Foods, 1930 - 1941

ITEMS COMPARED		Correlation coefficient[1]		
First	Second	r	r^2	s_r
Price cod and haddock	Cost of living index for food	0.45	0.20	±0.24
Price cod and haddock	Price competing foods (beef cattle, hogs, eggs)	0.48	0.23	±0.23
Price cod and haddock	Price eggs	0.41	0.17	±0.25
Price cod and haddock	Production cod and haddock	-0.05	0.0025	±0.30
Production cod and haddock	Price competing foods	0.68	0.46	±0.16
Production cod and haddock	Price eggs	0.87	0.76	±0.07
Total value cod and haddock	Cost of living index for food	0.76	0.58	±0.13
Total value cod and haddock	Price competing food	0.77	0.59	±0.12
Relative price cod and haddock	Production cod and haddock	-0.77	0.59	±0.12

B - Partial Correlations Among Price Cod and Haddock, Production Cod and Haddock, and Price of Competing Foods

ITEMS COMPARED		Correlation coefficient[1]		
First	Second	r	r^2	s_r
Price cod and haddock	Price competing foods	0.76	0.58	±0.13
Price cod and haddock	Production cod and haddock	-0.58	0.34	±0.20
Production cod and haddock	Price competing foods	0.80	0.64	±0.11

[1] The correlation coefficient r provides an objective measure of the closeness with which variations in the values of two series of compared items are associated. The value of r varies between +1.0 and -1.0, with r = +1.0 indicating perfect positive correlation, r = -1.0, perfect negative correlation, and r = 0, no correlation whatsoever. Intermediate values indicate varying degrees of positive and negative correlation. However, the degree of correlation is not directly proportional to the r value; that is, r = +0.40 does not indicate that the correlation is one-half as good as r = +0.80. In order to show this relationship r^2 can be used since it is approximately proportional to the degree of correlation. If variable 1 influences variable 2, and r equals 0.80, then r^2 or 0.64 represents the approximate fraction of the changes in variable 2 which result from changes in variable 1.

The standard errors of r, which are represented by the symbol s_r, also are given in Table 2 to provide a measure of the reliability of the calculated r values. The magnitudes of s_r in Table 2 indicate that in this series, r values of less than about +0.50 do not carry very much significance. Neither do small differences between r values at higher levels.

For a more complete discussion of r, r^2, and s_r, see any recent standard text on statistics.

These records show that the average price of fish for the year as a whole did not increase and decrease in agreement with decreases and increases in production (Figure 2, see p. 6) although the seasonal prices did change with seasonal increases and decreases in production (Figure 5, see p. 9). Changes in the prices of competing foods were accompanied by limited changes in the yearly average price of fish but much greater changes in production of fish (Figure 2). As a result, most of the changes in the annual value of the fish produced (production times price) were associated with changes in the price of competing foods (Figure 3, see p. 7). Another important fact demonstrated by this study was that the production (consumption) of fish was strongly influenced by the relative price of fish. That is, when the price of fish was high in relation to the price of competing foods, the production of fish declined, while when the price was low in relation to other foods, production increased (Figure 4, see p. 8). The APPENDIX includes a fuller discussion of these relationships.

POST-WAR DEVELOPMENTS: In the foregoing, we have discussed the recent strong upward trends in the New England production of fresh and frozen fish and in the importation of foreign fish. We have examined also the close relationship between

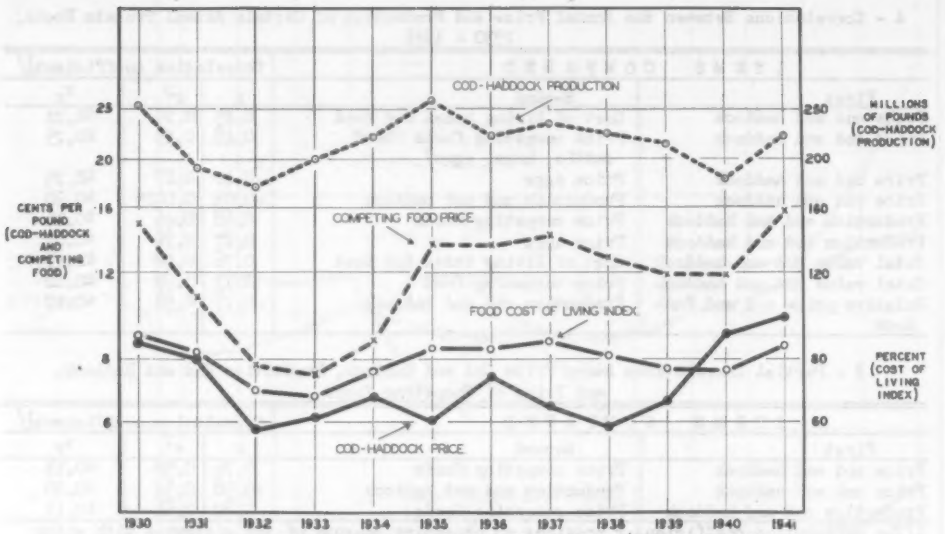


FIGURE 2 - THE PRODUCERS' ANNUAL AVERAGE PRICE OF COD AND HADDOCK (IN TERMS OF FILLET WEIGHT), COMPARED TO THE ANNUAL PRODUCTION OF COD AND HADDOCK; THE AVERAGE PRICE OF COMPETING FOODS (BEEF CATTLE, HOGS, AND EGGS) IN TERMS OF DRESSED WEIGHT AND POUNDS; AND THE COST OF LIVING INDEX FOR FOOD. PLOTTED TO LOGARITHMIC SCALES IN ORDER TO PROVIDE AN ACCURATE COMPARISON OF THE RELATIVE CHANGES IN VALUES.

the price of competing foods and the production and value of fish. What post-war future do these developments spell out for the New England fishing industry?

As long as shortages of meat, cheese, and eggs exist, there is little doubt but that our markets can absorb at present prices all of the fish that our industry can produce and process and, in addition, all that foreign countries are likely to be able to supply us under present conditions. However, as our food production program is revised and stepped up, as manpower and material shortages decline, and as the food demands from other countries decline as their own food production increases, the shortage of protein foods will disappear and the upward pressure on their prices end. This should occur for fish considerably earlier than for other protein foods. Domestic production and importation of fish is expanding much more rapidly than is the production of competing foods. Present fish prices, in relation to competing foods, are about 35 percent[1/] higher than

1/The dollar price of cod and haddock in 1944 was 150 percent above their 1930-41 average, while the average dollar prices of competing foods were about 85 percent higher than their 1930-41 average (Table 3, p. 13). Consequently, in terms of other foods, fish prices were about 35 percent above the 1930-41 average $\left(\frac{250}{185}\right)$.

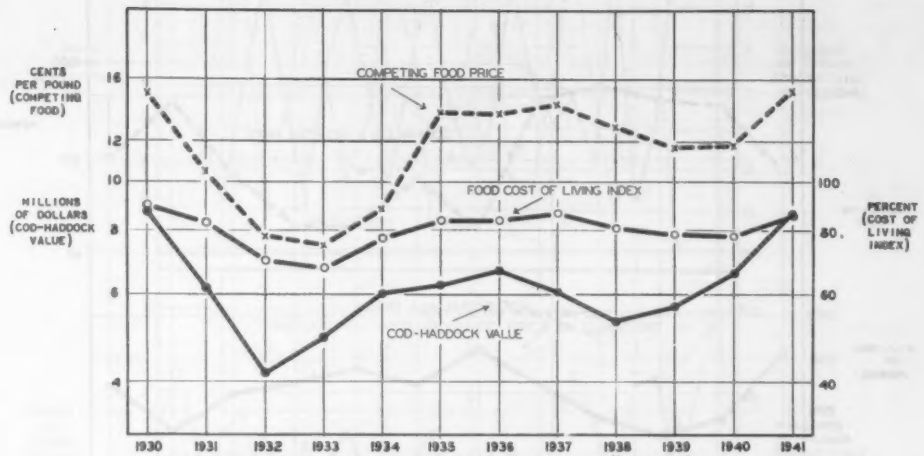


FIGURE 3 - THE TOTAL ANNUAL VALUE OF COD AND HADDOCK TO THE PRODUCER COMPARED TO THE AVERAGE PRICE OF COMPETING FOODS (BEEF CATTLE, HOGS, AND EGGS) IN TERMS OF DRESSED WEIGHT AND POUNDS, AND THE COST OF LIVING INDEX FOR FOOD. PLOTTED TO LOGARITHMIC SCALES IN ORDER TO PROVIDE AN ACCURATE COMPARISON OF THE RELATIVE CHANGE IN VALUES.

they were in 1941, or higher than they averaged from 1930 to 1941 (Table 3, see p. 13). This indicates that as over-all protein food shortages disappear, fish prices either must drop some 30 percent or more, even though there is no considerable decline in the price of competing foods, or consumption will be reduced materially.

When supplies of meat, eggs, and cheese again are abundant, people will eat fish because they want to rather than because they must. Under these conditions, sales again will depend on quality and price. By taking advantage of new developments in processing, distribution, and marketing, it should be possible to provide the American public with fish of a quality which few of them heretofore have enjoyed. If this can be done at a relative price which is reasonably comparable to that of pre-war years, the amount of fish consumed should increase tremendously. What proportion of this consumption United States fishermen will supply is the principal long-range problem facing United States producers and processors.

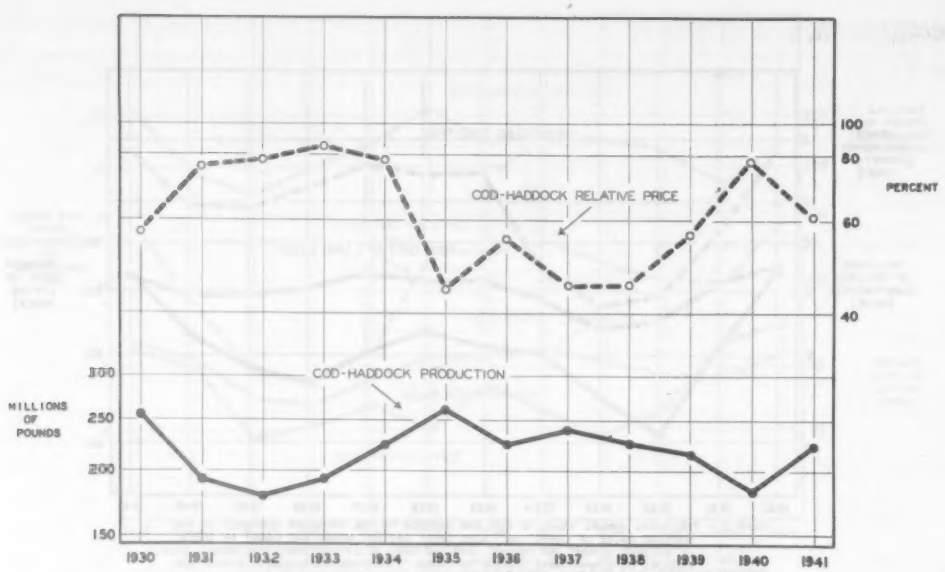


FIGURE 4 - THE RELATIVE PRICE OF COD AND HADDOCK (PRODUCERS' PRICE OF COD AND HADDOCK DIVIDED BY THE PRODUCERS' PRICE OF COMPETING FOODS), COMPARED TO THE PRODUCTION OF COD AND HADDOCK. PLOTTED TO LOGARITHMIC SCALES IN ORDER TO SHOW THE RELATIVE CHANGE IN VALUES.

A PLAN FOR THE EQUITABLE HANDLING OF THE FOREIGN FISH PROBLEM[1]: A drastic increase in tariff rates has been the traditional answer in this country to threats of destructive competition from foreign products produced by labor having much lower living standards than those which we expect for our people. However, in view of the growing international consciousness of the voters of the country, there is little likelihood of obtaining acceptance of a proposal designed primarily to exclude products of our neighbor nations. The problem then is to develop

1/ The ideas suggested in this plan have been discussed at length with Congressman Christian A. Herter, New England member of the Committee on Merchant Marine and Fisheries, with leaders of the New England and Middle Atlantic fishing industry representing fishermen, shoreworkers, boat owners, and processors, and with officials of the Fish and Wildlife Service. The author wishes to express his appreciation for their assistance in clarifying the ideas incorporated in the proposal. This brief outline is presented for the purpose of stimulating more thinking on this important problem to the end that the most satisfactory solution can be worked out and agreed upon. To be successful this, or any other agreed upon plan, must have the support of the entire fishing industry and be acceptable to the country at large.

Members of the staff of North Atlantic Fishery Investigations, Fish and Wildlife Service, have provided assistance on some of the work involved in this report, particularly Howard A. Schuck, who carried out many of the correlation calculations.

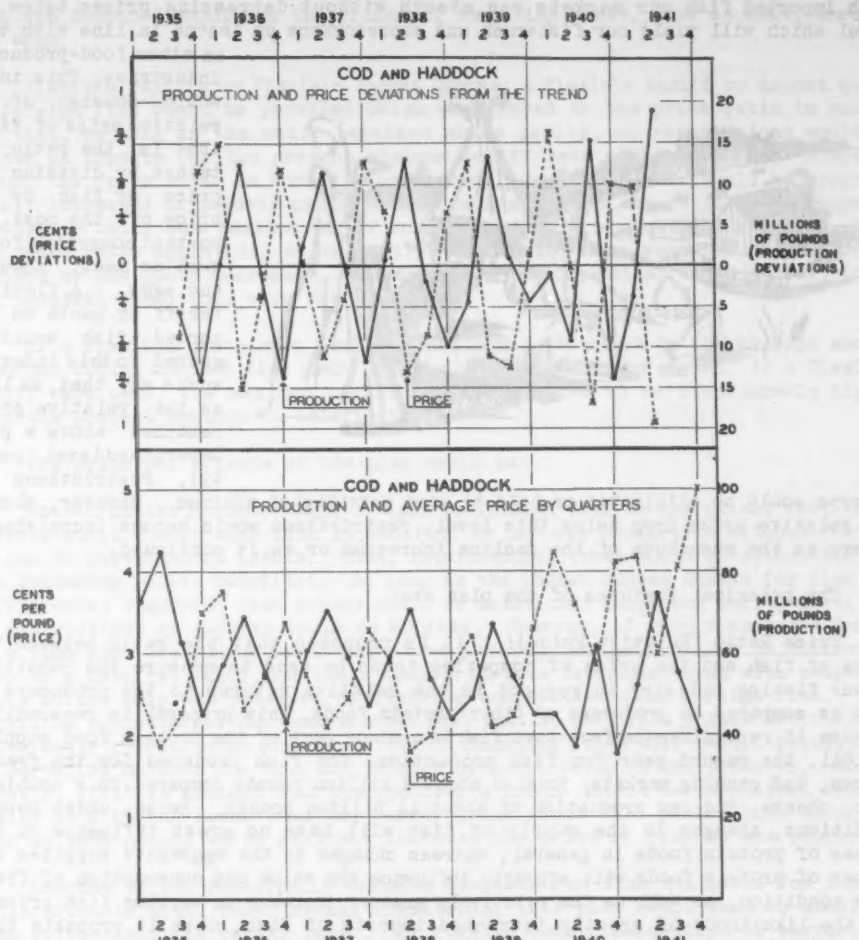

1935 1936 1937 1938 1939 1940 1941
1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4
COD AND HADDOCK
PRODUCTION AND PRICE DEVIATIONS FROM THE TREND
CENTS (PRICE DEVIATIONS)
MILLIONS OF POUNDS (PRODUCTION DEVIATIONS)
PRODUCTION
PRICE
COD AND HADDOCK
PRODUCTION AND AVERAGE PRICE BY QUARTERS
CENTS PER POUND (PRICE)
MILLIONS OF POUNDS (PRODUCTION)
PRODUCTION
PRICE
1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4
1935 1936 1937 1938 1939 1940 1941

FIGURE 5 - LOWER: PRODUCTION AND AVERAGE PRODUCERS' PRICES OF COD AND HADDOCK, BY QUARTERS.

UPPER: DEVIATIONS IN THE PRODUCTION AND PRICE OF COD AND HADDOCK FROM THE ANNUAL TREND. THE TREND WAS OBTAINED BY SMOOTHING THE QUARTERLY FIGURES BY A MOVING AVERAGE OF FOUR AND TWO TO REMOVE THE EFFECT OF SEASONAL VARIATIONS. SEE TEXT FOR DISCUSSION.

a reasonable plan which will prevent unrestricted foreign competition from driving our prices to distress levels, while at the same time allowing our neighbors to participate in our markets, to the extent that these markets can be expanded to absorb their production in addition to our own.

To meet this problem a "parity-ratio import-control" plan has been proposed. The essence of this plan is to vary the amount of imports according to the parity-ratio price index of fish. Control of the amount of fish imported could be exercised (1) by imposing a flexible tariff, increasing in rate as the price index falls, and reducing as the index rises, or (2) by establishing a quota on the amounts that can be imported. At lower price indices, import quotas would be reduced; at higher indices, quotas would be raised or removed to permit increased importation.

The basic assumption behind this plan is that it is in the national interest to open our markets to the fish produced by our neighbor nations to as great an extent as is consistent with the continued prosperity of our own long established fishing industry. To do this it is proposed to establish an index to show how

much imported fish our markets can absorb without depressing prices below the level which will yield our fishermen and shoreworkers an income in line with that in other food-producing industries. This index would consist of the relative price of fish; that is, the ratio obtained by dividing the price of fish by the price of the most important competing foods such as meat, cheese, and eggs. A flexible tariff or quota on imported fish would be geared to this index in such a way that, as long as the relative price remained above a predetermined level (parity), restrictions on imports would be eliminated or held to some established minimum. However, should the relative price drop below this level, restrictions would become increasingly severe as the magnitude of the decline increased or as it continued.

The principal features of the plan are:

Price Ratio (Relative Price): It is proposed that the ratio between the price of fish and the price of competing foods be used to measure the condition of our fishing industry in respect to the relative returns to the producers of fish as compared to producers of other protein foods. This proposal is reasonable, because it recognizes the fact that fish is a minor part of the protein food supply. In 1941, the record year for fish production, the fish produced for the fresh, frozen, and canning markets, totaled about 3 billion pounds compared to a combined meat, cheese, and egg production of about 44 billion pounds. Hence, under normal conditions, changes in the supply of fish will have no great influence on the prices of protein foods in general, whereas changes in the aggregate supplies and prices of protein foods will strongly influence the value and consumption of fish. This condition, as well as the relatively greater increase in wartime fish prices, and the likelihood of greatly increased imports of fish, make it probable that there will be a greater downward readjustment of fish prices than of prices of competing products, when conditions become normal after the war. Finally, the Congress appears to be definitely committed to a policy which will maintain the price of agricultural products at a high level. All of these considerations indicate the desirability of using the price of competing foods as a standard for judging the status of fish prices. This tie-in also is desirable for reasons to be brought out later.

Parity Price Ratio: A "parity" price ratio would be adopted to provide a standard by which it could be determined at any time whether or not the United States market could absorb increased quantities of foreign fish. This ratio should acknowledge the normal differential between fish prices and the prices of competing foods which existed during periods when the fishing industry was enjoying normally prosperous conditions, competing foods were normally available, and the public was buying fish in large quantities. The price ratio during some one year, or series of years, might be adopted for this purpose.

Since the parity ratio is to be used primarily as a standard to determine the amount of foreign fish which can be absorbed, it should be based on the prices of those species of fish which are likely to be shipped into this country in large and increasing quantities, such as cod, haddock, and rosefish. To include species which are not likely to be imported in large quantities would serve principally to complicate the plan and decrease the probability of its acceptance without yielding any major advantage by their inclusion. The commodities with which the

fish are compared should be the principal competing foods, such as meat, cheese, and eggs.

Flexible Tariffs or Flexible Import Quotas: A flexible tariff or import quota on foreign fish would be provided which was geared to the price ratio in such a way that, as long as the ratio remained above parity, no restrictions would be placed on imports (or the present minimum tariff rate could prevail). However, should the price ratio be forced below parity, the tariff rate would be progressively increased or imports progressively reduced, until the ratio again exceeded parity, or until some maximum tariff rate or minimum base quota was reached. When the price ratio again rose above parity, the tariff rate would be progressively reduced or the quota increased, as long as the ratio remained above parity, until the original conditions were restored.

If a flexible quota were used, the minimum quota might be the average amount imported during the last five years or some other agreed-upon period. If a flexible tariff were used, the maximum tariff rate would have to be considerably higher than the present maximum to be effective.

The principal effects of the plan would be:

United States markets would be open to foreign fish to the extent that these markets could absorb such fish in addition to our own production without forcing prices to sub-standard levels. Thus, international trade would be stimulated and the consuming public benefited. As long as the United States demand for fish was sufficiently vigorous, fish prices would be maintained above the parity level and no restrictions on imports would be applied. However, if supply exceeded demand at a time when the price level was above parity, the price would be allowed to drop to a level at which fish could compete on more favorable terms with competing foods before help was provided by limiting competition from foreign fish. This provision acknowledges the demonstrated fact that to hold fish prices artificially above their natural ratio with the prices of competing foods will result principally in curtailed markets for fish and reduced over-all value to the producer. Consequently, if it is decided that the producer's income should be maintained artificially at a higher level than the parity price ratio will yield, this should be done by some method which will not increase the price of fish to the public.

Because of the potentially enormous quantities of fish available for import, it is probable that, under normal conditions, this plan would tend to stabilize fish prices near the parity level. If foreign countries desired to participate to a greater extent in our markets, it would be to their interest to help develop these markets so that increased quantities of their fish might be absorbed without depressing prices below parity. Their sales could increase as our markets increased and to the extent that demand was not satisfied by domestic production.

By establishing parity in relation to competing agricultural products, the United States fishing industry would be assured of helpful action which would serve to keep the price of its product in line with those of other food-producing industries, and it would benefit indirectly from any Government action serving to maintain or increase agricultural prices.

Since fish competes directly with agricultural products, particularly eggs, this plan will indirectly benefit the farmer by preventing the flooding of our markets with foreign fish at prices with which the farmer cannot compete without dropping the price of his products to correspondingly low levels.

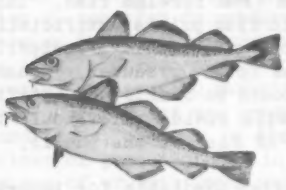
In spite of several years of unparalleled prosperity, the United States fishing industry now occupies a precarious and vulnerable position. The country as a whole is becoming increasingly conscious of the necessity of working out improved trade and economic relations with our neighbor nations. Yet it is obvious that, if we open our markets without restrictions to the fish produced by these countries under subsidies and labor conditions with which we cannot and do not wish to compete, our principal fisheries, at least those producing fresh and frozen fish, are doomed as

major industries. It is incumbent on the fishing industry to work out some program acceptable to the country at large, which will yield the industry reasonable protection while our markets are being expanded to absorb more fish, and the living standards of the fishermen of our neighbor nations are in transition from their present level to that which we now enjoy. It also would appear to be incumbent on our neighbor nations, who wish to profit from our markets, to cooperate with our industry in achieving a solution. Glutting of our markets during the next few years by a great influx of foreign fish, will not be conducive to the success of our hoped-for, post-war, full-employment program, neither will it help our international relations.

Appendix I— Relationship Between Fish Price and Production and the Prices of Competing Foods

The price of fish is determined by a complex of factors, among the most important being the supply of fish (amount produced), and the prices of various competing foods. In order to determine the actual and relative importance of these factors, a series of comparisons has been carried out with results as shown in Table 2, p. 5.

In making these comparisons, it appeared desirable to eliminate, insofar as possible, the effects of radical technological or marketing developments, such as filleting, development of new sources of supply, and greatly improved fishing methods, which would serve to mask the effects of the factors which it was desired to evaluate. (For example, rosefish jumped from a production of less than 2 million pounds and value of 1 cent a pound in 1934 to a production of about 140 million pounds and value of over 2 cents a pound in 1941, as the result of processing and marketing developments.) Consequently, cod and haddock were selected to represent fish, and the years from 1930 to 1941 were used, since during this entire period these species accounted for a large share of New England production, and they were an accepted product in the markets, from a fishery which underwent no radical changes technologically or biologically. Thus, the effects of changes in production or in the prices of competing foods would be least obscured. The years preceding 1930 were not used, because during the late 1920's the industry was in a condition of rapid change as a result of the development of filleting and packaging; and the war years from 1942 on were not used, since war shortages and regulations brought in a new set of factors which would obscure the effect of the factors which it was desired to measure.



Beef cattle, hogs, and eggs were used to represent the principal competing protein foods. Cheese was not used, since no price index was available for the full period from 1930 to 1941. The U.S. Bureau of Labor Statistics' cost-of-living index for food also was used for comparison.

In order to make the various prices reasonably comparable, in each case the producers' average price was adjusted so that it represented the value received for the marketable portion of the various products. The fishermen's price was multiplied by $2\frac{1}{2}$ (haddock and cod fillets normally equal about 40 percent of the landed weight of the fish), the farmers' price for beef cattle was multiplied by 1.85 (dressed weight equals about 54 percent of live weight), hog prices were multiplied by 1.47 (dressed weight equals about 68 percent of live weight), and egg prices per dozen by 0.75 (one dozen eggs weighs about 1-1/3 pounds), Table 3, p. 13.

Table 3 - Producers Prices for Certain Animal Protein Foods and Related Data

Year	COD AND HADDOCK[1]				Cost of[2] living food index	COMPETING PROTEIN FOOD[2]						Average Dressed meat and eggs, per pound	Price ratio fish[3] competing food
	Production	Value				Beef cattle		Hogs		Eggs			
	Millions of pounds	Total in millions	Per Pound As landed	Per Pound Fillet weight[3]		Live, per pound	Dressed,[4] per pound	Live, per pound	Dressed,[5] per pound	Per dozen	Per pound[6]		
		$	¢	¢	%	¢	¢	¢	¢	¢	¢	¢	%
1930	254	8.75	3.44	8.60	90	7.71	14.26	8.84	12.99	23.7	17.78	15.01	57
1931	192	6.15	3.20	8.00	83	5.53	10.23	5.73	8.42	17.6	13.20	10.62	75
1932	178	4.17	2.34	5.85	70	4.25	7.86	3.34	4.91	14.2	10.65	7.81	76
1933	201	4.94	2.46	6.15	68	3.75	6.94	3.53	5.19	13.8	10.35	7.49	82
1934	223	6.02	2.70	6.75	76	4.13	7.64	4.14	6.09	17.0	12.75	8.83	76
1935	260	6.30	2.42	6.05	84	6.04	11.17	8.65	12.72	23.4	17.55	13.81	44
1936	224	6.68	2.98	7.45	84	5.82	10.77	9.37	13.77	21.8	16.35	13.63	55
1937	237	6.10	2.58	6.45	87	7.00	12.95	9.50	13.97	21.3	15.98	14.30	45
1938	226	5.27	2.33	5.83	81	6.54	12.10	7.74	11.38	20.3	15.23	12.90	45
1939	216	5.67	2.63	6.58	79	7.14	13.21	6.23	9.16	17.4	13.05	11.81	56
1940	182	6.57	3.61	9.03	78	7.55	13.97	5.39	7.92	18.0	13.50	11.80	77
1941	222	8.65	3.90	9.75	85	8.80	16.28	9.09	13.36	23.5	17.63	15.76	62
1942	153	10.10	6.60	16.50	98	10.62	19.65	13.04	19.17	29.9	22.43	20.42	81
1943	133	12.12	9.11	22.78	103	11.80	21.83	13.70	20.14	37.0	27.75	23.24	98
1944	153	11.22	7.32	18.30	105	7/11.80	21.80	7/13.10	19.30	7/33.8	25.40	22.20	82
Average 1930-41				7.21			11.45		9.99		14.50	11.98	62.5

1/Fish and Wildlife Service reports "Landings at Boston, Gloucester, and Portland."
2/U.S. Department of Agriculture, Agricultural Statistics 1944, and U.S. Department of Commerce "Survey of Current Business."
3/Producers price for the fillet portion of the fish equals 2/3 times the landed price. (Fillet weight equals 40 percent landed weight.)
4/Farmers price in terms of dressed weight equals 1.85 times the live price. (Dressed weight equals 54 percent live weight. Agricultural Statistics 1944)
5/Farmers price in terms of dressed weight equals 1.47 times the live price. (Dressed weight equals 68 percent live weight. Agricultural Statistics 1944)
6/Farmers price in terms of pounds. (One dozen eggs equals 1-1/3 pounds.)
7/Tentative.

From month to month there is a high negative correlation between the price of fish and the quantity produced. This is illustrated in Table 4, and Figure 5, p. 9, showing the average price and the total production of cod and haddock for each quarter of the year from 1935 to 1941. In order to eliminate the effects of

Table 4 - Production and Average Price of Cod and Haddock, 1935-1941, By Quarters

Year	Quarter	Total production	Average price	Deviations from the trend[1]	
				Production	Price
		Hundred thousand pounds	Cents	Hundred thousand pounds	Cents
1935	1	725	2.52	-	-
	2	848	1.89	-	-
	3	574	2.27	- 56	-.43
	4	449	3.49	-141	+.59
1936	1	570	3.76	+ 3	+.74
	2	687	2.31	+125	-.75
	3	551	2.73	- 11	-.18
	4	430	3.36	-138	+.60
1937	1	605	2.73	+ 24	+.03
	2	701	2.09	+115	-.56
	3	590	2.45	+ 1	-.21
	4	470	3.28	-118	+.63
1938	1	589	2.92	+ 8	+.36
	2	703	1.79	+133	-.65
	3	535	2.00	- 19	-.42
	4	437	2.82	-100	+.33
1939	1	491	3.19	- 44	+.63
	2	671	2.10	+133	-.55
	3	544	2.23	+ 10	-.61
	4	449	3.31	- 43	+.15
1940	1	451	4.23	- 12	+.81
	2	371	3.61	- 92	-.01
	3	617	2.87	+154	-.83
	4	379	4.11	-140	+.50
1941	1	520	4.16	- 37	+.48
	2	744	2.98	+191	-.96
	3	553	4.06	-	-
	4	406	5.01	-	-

1/To obtain the trend, the values by quarters were smoothed by a moving average of 4, to remove the seasonal variation. The smoothed figures then were smoothed again by 2, to obtain trend values for the mid point of the quarters.

long-time trends in price and production, the quarterly data were smoothed by a moving average, and the deviations in price and production were obtained from these smoothed averages. The correlation between the price and production deviations was $r = -0.79$, $r^2 = 0.62$, $s_r = 0.08$. The only considerable departures from the high negative correlation were for the first quarter of the year, when fish prices were consistently higher than would be indicated by the associated production. Probably this arose because of the abnormally heavy demand for fish during the Lenten season.

Because of the strong short-time influence of production on price deviations, the effect of competing food prices is obscured in any short-term comparison of fish prices and the prices of competing foods. Consequently, annual production and annual average prices have been used in a more extensive analysis of these factors.

The weighted annual prices for cod and haddock were compared with the corresponding cost-of-living index for food and with the average prices for beef cattle, hogs, and eggs, separately and combined (Table 3, p. 13, and Figure 2, p. 6). Except for the decided drop from 1930 to 1932, which was common for all of the indices, there is little correlation between fish prices and the other items. For the entire series from 1930 to 1941, the correlation coefficient between fish prices and the cost-of-living index for food was $r = 0.45$, $r^2 = 0.20$, while that between fish prices and the average price of competing foods (beef cattle, hogs, and eggs)

was $r = 0.48$, $r^2 = 0.23$. Apparently, neither the prices of other protein foods nor the general cost of food was the major factor in determining the average annual price of fish.

The annual average prices of cod and haddock also were compared with the annual production of these species for the same years (Figure 2, p. 6). The correlation coefficient was -0.05, a value so low as to indicate that there was no consistent direct relationship between these variables. The result is counter to the normally accepted belief regarding price and supply, and has some interesting implications for the fishing industry (see p. 16).

Another series of comparisons between the production of cod and haddock and the average price of competing foods yielded a much higher correlation, $r = 0.68$, $r^2 = 0.46$, suggesting that the prices of these foods had a considerably greater influence on the production of fish than on its price. The relationship of competing food prices to the value of the fish produced was even closer, with $r = 0.77$, $r^2 = 0.59$.

These relationships suggest a number of interesting conclusions concerning fish production and prices. First of all, they show that in this fishery the variations in the average annual price received by the fisherman are not related very closely to variations in either the price of competing protein foods ($r^2 = 0.23$) or in the production of fish ($r^2 = 0.0025$). However, the total value received by the fishermen is closely related to the price of competing foods ($r^2 = 0.59$).

The failure of the price of fish to respond very considerably to the price changes of competing protein foods, at first glance, is as surprising as is the fact that changes in fish prices showed no direct relationship to changes in fish production. The explanation lies in the interrelationships among the various items, competing food price, fish price, and fish production. For instance, using eggs as an example, the relationship between the price variations of eggs and those of fish was $r^2 = 0.17$, but the relationship between the price variations of eggs and production variations of fish was $r^2 = 0.76$; thus changes in the production of fish were associated very closely with changes in the price of eggs, but changes in the price of fish were only about one-fifth as close.

The absence of direct correlation between fish price and fish production ($r^2 = 0.0025$) also is the result of the interrelationships among fish prices, fish production, and the price of competing foods. Taken by individual pairs, the direct relationships are as follows: fish production and fish price, $r = -0.05$, $r^2 = 0.0025$; price of competing foods (beef cattle, hogs, and eggs) and fish price, $r = 0.48$, $r^2 = 0.23$; price of competing foods and fish production, $r = 0.68$, $r^2 = 0.46$. Thus, among these items the only considerable influence indicated by simple correlation analysis is that shown by the price of competing foods on fish production. The effect of these competing food prices on fish prices was only about one-half as great, while the direct effect of fish production on fish price appeared to be nil. However, if the same data are analyzed by partial correlation, the results are quite different. The correlation between the price of competing foods and price of fish, when the effect of changes in fish production is removed, is $r = 0.76$, $r^2 = 0.58$ (compared to 0.48 and 0.23 with simple correlation). The correlation between the price of competing foods and fish production, when the effect of changes in fish price is removed, is $r = 0.80$, $r^2 = 0.64$ (compared to 0.68 and 0.46 with simple correlation). But most striking is the partial correlation between fish production and fish price, when the effect of changes in the prices of competing foods is removed, which becomes $r = -0.58$, $r^2 = 0.34$ (compared to $r = -0.05$ and $r^2 = 0.0025$ with simple correlation).

These figures indicate the extent to which increases and decreases in the price of competing foods influence the price, production, and total value of fish. Increases in prices of competing foods would be paralleled closely by increases in fish prices, if production of fish did not increase. Similarly, decreases in the price of competing foods would be accompanied by corresponding declines in fish prices, if production remained constant. However, production of fish is highly flexible. Consequently, when an increase in the price of competing foods

causes a slight increase in fish prices, it becomes profitable to increase the production of fish. Thereafter, most of the upward pressure from the increased price of competing foods is expended in increasing the production of fish (by increasing the market) rather than the average price. Similarly, a generally-falling food price level results in decreases in the production of fish more than in decreases in price.

From these data it seems reasonable to conclude that, in fisheries where the fish populations are not exploited fully (as also with products obtained from other not fully exploited natural resources) and production can be increased or decreased with relative rapidity and with no great change in production costs, the price of the raw material never deviates greatly from some basic level which is closely related to cost of production as long as no artificial restraints are placed on expansion or contraction of the fishing effort. Thus, changes in the price of competing foods are reflected as changes in fish production to a much greater extent than as changes in fish prices. Under normal conditions, a decrease in other food prices results in the sale of a smaller amount of fish at about the same price rather than in a correspondingly lower price for the same production of fish, and conversely, for an increase in other food prices. As a consequence, it follows that, although changes in the prices of competing foods do not cause great changes in the average price received by the fish producer, they do cause considerable changes in the market for fish, with the result that the total value received by the producer is dependent to a large extent on the prices of competing foods.

The behavior of fish prices during the war years prior to Office of Price Administration ceilings, illustrates the operation of these relationships. The price of competing foods increased rapidly in 1941, 1942, and 1943. If fish production had been free to expand without limitation, most of the effect of the higher prices for competing foods would have been expended in greatly increased production. However, instead of fish production being free to expand, it was forced to contract as the result of the Government taking over many of the best fishing boats and the restrictions on new construction caused by the shortage of materials, shipbuilding facilities, and high costs. The upward pressure on fish prices from the combined effects of high prices for competing foods and contracted production caused fish prices to increase much more rapidly than did the prices of other foods for which production could and did increase. For instance, the average price of cod and haddock in 1943 was 134 percent above the 1941 average (in spite of price ceilings during the last six months of 1943), while the average price of competing foods in 1943 had risen only 47 percent above the 1941 average, partly as the result of earlier price control. Thus, during the first two war years cod and haddock prices increased nearly three times as much as did the prices of the foods with which they compete.

Before leaving this subject of fish versus competing foods, one other relationship should be discussed: that between the relative price of fish (the ratio of fish price to the price of competing foods) and consumption of fish. (Annual consumption of species used fresh and frozen approximates production.) The data are shown in Table 3, p. 13, and Figure 4, p. 8. The correlation is $r = -0.77$, $r^2 = 0.59$. Compare this with the direct correlation between fish price and fish production, $r = -0.05$, $r^2 = 0.0025$. This indicates that, although the price of fish has very little direct relation to the production (consumption) of fish, the relative price of fish does have a close inverse relation to consumption; that is, when fish is low priced in comparison with other foods, consumption is high, and when it is high priced in relation to other foods, consumption is low. According to these figures, nearly two-thirds of the changes in consumption of cod and haddock, from 1930 to 1941, were related to changes in the relative price of these species.

THIAMINE ASSAYS OF FISHERY PRODUCTS[1]

By Philip M. Sautier*

In the data available on the nutritional values of foods there is a lack of information on the quantities of thiamine (vitamin B_1) in fishery products. The results of the few assays that have been published, however, indicate that some fishery products do contain significant amounts of thiamine.

Table 1 - The Thiamine Content of the Edible Flesh of Fishery Products of Southeastern Alaska

Common Name	Scientific Name	Number of Assays	Thiamine content micrograms per 100 grams	
			Range	Average
Clams--butter	Saxidomus giganteus	2	138-140	139
cockle	Cardium corbis	2	68-69	69
horse	Schizothaerus nuttalli	2	127-129	128
little neck	Paphia staminea	2	73-77	75
mud	Mya arenaria	2	78-80	79
Cod--grey	Gadus macrocephalus	2	90-94	92
ling	Ophiodon elongatus	2	36-62	49
kelp (Alaska greenling)	Hexagrammos octogrammus	2	100-110	105
Crab--dungeness	Cancer magister	2	170-182	176
Eulachon	Thaleichthys pacificus	2	30-40	35
Flounder--arrow-tooth halibut	Atheresthes stomias	1		60
Dover sole	Microstomus pacificus	1		59
English sole	Parophrys vetulus	2	60-64	62
flathead sole	Hippoglossoides classodon	2	40-42	41
petrale sole	Eopsetta jordani	1		68
rex sole	Errex zachirus	1		38
rock sole	Lepidopsetta bilineata	1		62
starry flounder	Platichthys stellatus	1		58
Halibut	Hippoglossus hippoglossus	6	30-82	45
Halibut cheeks		1		58
Herring	Clupea pallasii	16	11-40	23
Mussels	Mytilus edulis	1		162
Octopus	Octopus bimaculatus	2	2-48	25
Rockfish-black	Sebastodes species	2	78-83	81
brown	Sebastodes species	1		29
red	Sebastopyr ruberrimus	4	42-73	55
Sablefish	Anoplopoma fimbria	2	105-120	113
Salmon--red	Oncorhynchus nerka	2	140-155	148
pink	Oncorhynchus gorbuscha	3	139-150	143
chum	Oncorhynchus keta	3	73-84	80
silver	Oncorhynchus kisutch	3	84-90	87
king	Oncorhynchus tschawytscha	3	92-109	101
Shrimp--pink	Pandalus borealis	1		57
sidestripe	Pandalopsis dispar	1		47
Trout--cutthroat	Salmo clarkii	1		56
Dolly Varden	Salvelinus malma	2	60-62	61
rainbow	Salmo irideus	1		76
steelhead	Salmo gairdnerii	1		75

Assays of the content of this vitamin in various fishery products of Southeastern Alaska were carried out at the Fishery Products Laboratory in Ketchikan and are presented here for the purpose of supplementing the nutritional data now available. In all cases, unless otherwise stated, the analyses were made on the uncooked, edible portion only. Since there would be significant losses of thiamine during cooking or processing, the figures given are only suggestive of the quantity of the vitamin that would be available in the product as actually eaten.

1/ This is the first of two articles by this author on the occurrence of the B vitamines in fishery products. In the March 1946 issue of Commercial Fisheries Review will appear "Riboflavin Assays of Fishery Products."

* Formerly Assistant Technologist, Ketchikan Fishery Products Laboratory.

The analytical procedure used was the method recommended by the American Association of Cereal Chemists (1941), with the following slight modifications: The vitamin was extracted by refluxing the sample with 2 percent acetic acid on a steam bath for 30 minutes, instead of 15, and was then cooled, adjusted to pH 4.5 and incubated for 1 hour at 50° C. with takadiastase. After the thiamine was

Table 2 - The Thiamine Content of Miscellaneous Raw Fishery Byproducts of Southeastern Alaska

Portion Assayed	Sample	Number of Assays	Thiamine content micrograms per 100 grams	
			Range	Average
Liver:				
	Salmon--red	1	83-172	204
	pink	2	83-172	128
	chum	1		92
	silver	3	102-140	121
	king	3	73-243	136
	Lingcod	3	63-137	98
	Grey cod	5	64-106	87
	Sablefish	1		97
	Arrow-tooth sole	1		139
	English sole	1		134
	Flathead sole	1		120
	Grayfish (Squalus suckleyi)	2	13-22	18
Roe:				
	Herring	2	70-199	135
	Salmon--red	1		300
	pink	1		333
	chum	1		229
	silver	1		400
	king	1		432
Heads:				
	Salmon--pink	1		72
	king	1		80
	Halibut	3	50-60	55
	Lingcod	1		43
	Red rockfish	2	65-92	79
Milt:				
	Herring	1		52
Entire viscera:				
	English sole	1		420
	Herring	1		86
Miscellaneous:				
	King salmon backbones (from filleting)	1		93
	Shrimp waste (including heads, tails, small shrimp, etc.)	1		77

absorbed on Decalso, a hot solution of 25 percent potassium chloride in 2 percent acetic acid was used for the elution. However, since this work has been done, some questions have arisen regarding the method employed, and further improvements have been suggested.

Table 3 - The Thiamine Content of Miscellaneous Marine Products of Southeastern Alaska

Common Name	Scientific Name	Number of Assays	Thiamine content micrograms per 100 grams	
			Range	Average
Octopus (whole tentacle)	Octopus bimaculatus	1		29
Sea cucumber	Stichopus californicus	2	30-40	35
Shrimp (whole)	Pandalus borealis	1		79
Starfish--orange	Pisaster giganteus	1		07
brown	Pisaster ochraceus	1		13
purple	" "	2	6-13	10
twenty ray	Pycnopodia helianthoides	1		17
Hair seal liver	Phoca richardii richardii	1		140
Steller sea lion--flesh	Eumetopias jubata	1		43
liver		1		183
blubber		1		17

The data in Table 1 (shown on p. 17) indicate that the ordinarily edible portion contained, when raw, from 2 to 182 micrograms of thiamine per 100 grams of material. Thus, before being cooked, an average serving portion would have contained from 2 to 250 micrograms of the vitamin as compared to a daily requirement for man of about 1,700 micrograms. Thiamine, however, is easily destroyed by exposure to heat and air, and a significant part would, undoubtedly, be destroyed by ordinary cooking methods. These analyses do not show the effects of seasonal and other environmental changes.

The data of Tables 2 and 3 (shown on p. 18) indicate that portions or species not ordinarily used by humans may contribute thiamine for animal feeding.

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THE COVER PAGE

Photographs of attractive fish dishes are useful in increasing consumer interest in fish and shellfish. The Fish and Wildlife Service, in its Market Development Section, is accumulating a library of photographs which, among other uses, will be made available to the fishery industries to supplement its publicity work. Various firms and organizations are contributing to the collection. The photographs reproduced on the cover include:

Center - Planked lake trout --Courtesy of Smith Bros., Port Washington, Wisconsin.

Left top - Salmon steaks and shrimp
Left bottom - Broiled flounder
Right top - Baked mackerel
Right bottom - Fried sea scallops
} --Courtesy of the Fishery Council, New York City, New York.

TECHNOLOGICAL RESEARCH IN SERVICE LABORATORIES

Seattle, Wash.

Sample lots of precooked oyster stew and creamed oysters prepared at this laboratory were found to be in excellent condition after one month's frozen storage. Dilution by drip will make it necessary to modify the tomato sauce used in the test runs of frozen oyster cocktail, however. It was also found that cooked oysters gave a much more satisfactory frozen cocktail than raw oysters.

Two antibiotics were tried as means of slowing decomposition of fish. The antibiotics had little effect in dips, but when added to a solution in which the fish were stored, these materials did enhance the keeping quality.

Fish frozen last summer in Southeastern Alaska by a commercial company were cooperatively examined and graded.

Dr. Belle A. Stevens, Department of Animal Biology, University of Washington, was assisted in making photographs of Southeastern Alaska shrimps. Dr. Waldo Schmitt of the Smithsonian Institution will identify the various species so as to clear up present confusion in the usage of their common names.

Work has been progressing on the design of a mechanical molding device for packaged frozen fish and on an adapter to be used in the spectrophotometric analysis of vitamin A.

The Smaller War Plants Corporation received help in the evaluation of the prospectus of a concern proposing to can king crab and salmon in Alaska.

College Park, Md.

The research dealing with the utilization of various anti-oxidants in packaged fish is progressing, and in the near future, definite information and recommendations should be available. Fatty fish are the most difficult fish to store frozen over long periods of time, because the fats tend to combine with the oxygen of the air in the freezer and thus become rancid. Losses of considerable quantities of fish each year are due to such rancidity. If a method is developed which can be applied to fatty fish to prevent oxidation, it will save many thousands of pounds of fatty fish each year.

The studies dealing with the bleeding of fresh-shucked oysters were completed, and a report is being prepared. This report will be presented at the hearings before the Food and Drug Administration on January 15. The information was obtained to ascertain whether or not the limitations on moisture content included in the proposed Food and Drug regulations allowed sufficiently for the actual bleeding of the fresh-shucked oysters.

Some studies have been begun dealing with the use of the micro-biological assay methods for determining the amounts of B-complex vitamins in fishery products.

Tested recipes were supplied to the National Fisheries Institute to be included in the Institute's series of radio broadcasts. Advice was given on the program of technological investigation which the State of Maryland plans to sponsor.

Mayaguez, Puerto Rico

At the end of the month, a shipment of reputedly poisonous fish (Caranx species) was received from a San Juan fish dealer. These specimens will undergo further examination.

Ketchikan, Alaska

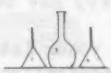
Analyses of locally available herring indicated that these fish contained an average of 15.4 percent oil, but that only a little over 9 percent was extractable by normal industrial processes.

Work was continued on the determination of the filleting characteristics of rockfish and was also extended to flounders and sea bass.

Scarcity of king crabs prevented an early beginning of the investigation into the possibility of freezing this product. Shrimp frozen alive in salt water were shipped by air from Petersburg to Ketchikan and thence to Seattle.

Data on sablefish landings were supplied to the office of the Allocator in Seattle.

A committee appointed by the Board of Regents of the University of Alaska visited the fishery laboratory and received information on how the laboratory could cooperate in an extension of the University's activities to Southeastern Alaska.



FRESH AND FROZEN FISH

New England

MAINE'S LOBSTER FISHERY: The lobster fishery along the coast of Maine, chief United States source of this crustacean, was so successful in 1945 that the total catch may rival the heavy production of this industry during the 1880's, the Fish and Wildlife Service reported on January 24.

Reports received from fishery authorities of the State of Maine indicate that the yield of lobsters during the first 11 months of the year was approximately 18 million pounds. The catch during December, not yet tabulated, probably added little to this total because of stormy weather.

Lobster production only a few years ago had fallen so low that serious concern was felt for the future of this resource. However, an increase in the catch of lobsters became apparent several years ago, the catch in Maine rising from an average of seven million pounds, during the period between 1935 and 1940, to 11.5 million pounds in 1943. Last year the upward trend continued; the 1944 catch was about 13 million pounds.

Biological studies now being conducted by the State and Federal Governments are expected to show whether the increase in the catch is actually the result of an increase in the lobster population or may be due to other causes.

Lobstering is one of the chief industries along the Maine coast, giving employment to more men than any other fishery of the State. In 1945, 5,307 lobster fishermen were licensed in Maine.

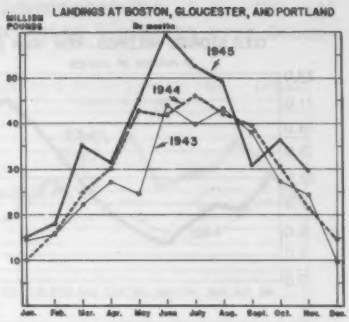
Although lobsters are found as far south as New Jersey along the shore and as far as North Carolina in deep water, about two-thirds of the United States catch is taken in Maine waters. Rockland, the Mt. Desert area, Boothbay Harbor, and Portland are important centers of the fishery.

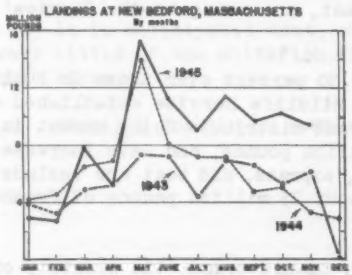
Full time lobstermen operate from 100 to 150 traps or pots, which they visit daily if weather permits. Part time fishermen who depend on other occupations for their principal livelihood may operate two or three dozen pots to supplement their income.

Wartime shortages of rope, lath, and other pot materials, and engine parts have been considerably eased, and with the return of fishermen who have been in service, the intensity of the fishery may be expected to increase.

Experiments on the rearing of young lobsters in hatcheries are carried on by the Fish and Wildlife Service in cooperation with the Maine Department of Sea and Shore Fisheries at Boothbay Harbor. In addition to artificial propagation, measures used to conserve the lobster resource are the protection of spawning females and the imposition of size limits.

LANDINGS AT BOSTON, GLOUCESTER, AND PORTLAND: Landings by fishing craft at Boston, Gloucester, and Portland during November totaled 29,479,000 pounds, valued at $1,971,700 to the fishermen, according to the Service's Current Fishery Statistics No. 244. This was an increase of 36 percent in quantity landed compared with November 1944. Landings during the first 11 months of 1945 totaled 404,257,000 pounds compared with 347,816,000 pounds landed during the corresponding period of 1944, an increase of 16 percent.

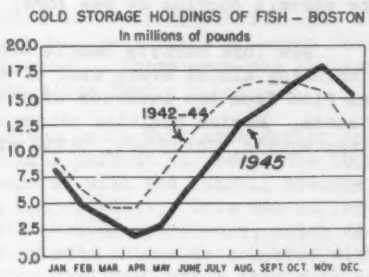




LANDINGS AT NEW BEDFORD: Fishery products landed at New Bedford, Mass., during November totaled 9,548,000 pounds, valued at $841,700 to the fishermen, according to the Service's Current Fishery Statistics No. 243. This was an increase of 184 percent in quantity landed, compared with November 1944. Total landings during the first 11 months of 1945 amounted to 97,009,000 pounds compared with 72,036,000 pounds landed during the corresponding period of 1944, an increase of 35 percent.

COLD-STORAGE HOLDINGS: Cold-storage holdings in Boston on December 26 amounted to 15,734,000 pounds, according to the Service's Market News Office in that city. While this figure is 13 percent below holdings on November 28, it is 24 percent above stocks held on December 27, 1944.

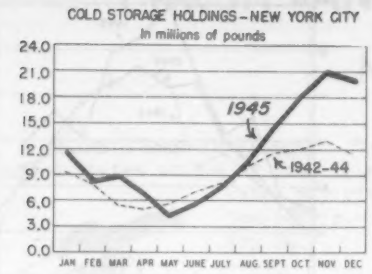
Pollock fillets, halibut, and shrimp showed the largest gains during December, while stocks of cod, haddock, and mackerel fillets, sea herring, mackerel, smelt, swordfish, and squid showed the largest decreases.



Middle Atlantic

NEW YORK CITY HOLDINGS: Despite light arrivals of fresh fish in the New York market during the month of December due to the generally severe weather conditions along the Atlantic Coast, cold-storage withdrawals of fishery products were moderate, with holdings in the New York metropolitan area dropping close to a million pounds.

As of January 3, 1946, the New York inventories of frozen fishery products totaled 20,395,000 pounds, about 46 percent higher than the holdings of a year previous. Withdrawals of frozen groundfish, mackerel, whiting, shrimp and eels, the latter a Christmas specialty, were compensated to some extent by substantial deliveries of cod fillets, salmon, and sablefish to freezers, so that the net



drop in holdings was less than normally expected. Principal items on hand in freezers of the area on January 3, were cod and cod fillets, Boston mackerel, king salmon, sablefish, shrimp, and squid.

Holdings of fresh-water fish remained more than double the inventory of a year previous, with cisco and whitefish held in greatest quantity. Withdrawals of both these items by smokers were heavy during the month; however, over 1,345,000 pounds of cisco and 575,000 pounds of whitefish remained in storage at the beginning of January.

NEW YORK CITY RECEIPTS--1945: New York City, the country's largest market for fresh fish, set a new record in 1945, when 278 million pounds of marine fishery products were received by the salt-water market, according to the Service's Market News Office in that city.

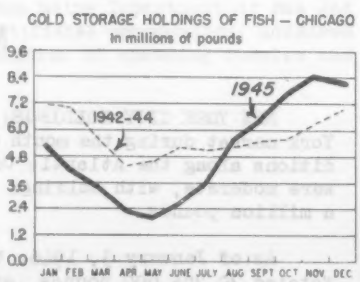
The 1945 receipts represented an increase of 30 percent over those in 1944, and were the largest recorded since the Fish and Wildlife Service established a Market News Office in New York in 1939 to collect and distribute daily market information. New York receipts in 1939 were 228 million pounds, and have increased in each successive year. Shipments by rail, truck, express, and boat are included in the figures. In addition to marine species, about 25 million pounds of fresh-water fish are received annually.

While total receipts have registered a steady upward trend, the quantity of fish actually landed at New York by boat has been declining since 1939, reaching a low of 16 million pounds in 1945. In 1939, 41 million pounds of fish were landed by vessels docking at New York.

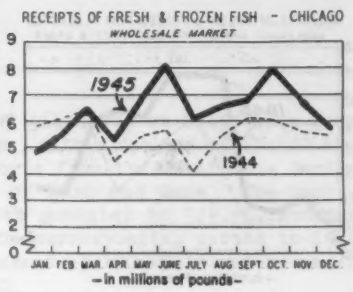
New York markets handle about 125 different species of fish and shellfish, including almost every kind of aquatic food taken on the Atlantic Coast, as well as fish from the interior of the country, the Pacific Coast States, Alaska, and Canada. Marine oddities seldom seen elsewhere are to be found in New York, among them squids, octopuses, skate wings, angler fish, periwinkles, and sea urchins.

Great Lakes

CHICAGO HOLDINGS: Total holdings of fishery products in Chicago cold-storage warehouses on December 27, amounted to 8,245,000 pounds, according to the Service's Market News Office in that city. Although there was a decline of 2 percent in the stocks compared with those of November 29, they displayed a gain of 24 percent over total holdings on December 28, 1944. Salt-water fish and shellfish showed the largest increases in holdings during the year by rising 51 and 33 percent, respectively, above those of 1944.



CHICAGO RECEIPTS: Receipts of fresh and frozen fishery products on the Chicago market during December totaled 5,904,000 pounds, increasing 9 percent over December 1944, according to the Service's Market News Office in that city. Although halibut receipts fell 23 percent below those of November, this species led all others in volume during the month, representing 15 percent of the total receipts.


RECEIPTS OF FRESH & FROZEN FISH - CHICAGO
WHOLESALE MARKET
1945
1944
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
—In millions of pounds—

With the exception of shrimp from the Gulf area, there was a general decline in receipts of both fresh and salt-water species, and salmon, especially, showed a marked decline during the latter half of the month.

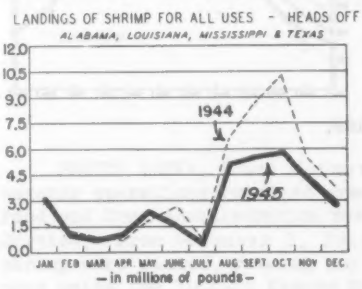
Shrimp made a particularly strong showing toward the end of December, with a total of 719,000 pounds, a gain of 13 percent over the previous month.

It is anticipated that, with receipts of fresh-water fish on the decline, very little of the whitefish from the Canadian Provinces will find its way into cold storage.

Receipts for the 12 months of 1945 totaled 77,561,000 pounds.

Gulf

GULF PRODUCTION: Total Gulf landings of fresh and salt-water fish rose to more than a million pounds during 1945, according to the Service's Market News Office in New Orleans. These were the largest recorded landings since 1940.


LANDINGS OF SHRIMP FOR ALL USES - HEADS OFF
ALABAMA, LOUISIANA, MISSISSIPPI & TEXAS
1944
1945
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
—In millions of pounds—

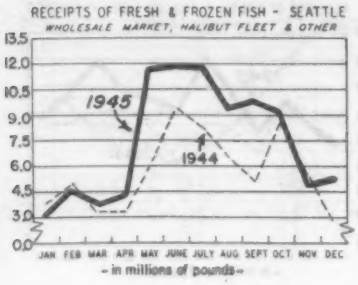
Shrimp landings in the Gulf area during the year failed by 21.1 percent to reach the 1944 totals, and compared with the 1940-44 average, they were short 24.5 percent. This was reflected in the year's canning operations, which declined about one-third in volume as compared with 1944. Shrimp for purposes other than canning remained at the same level as that for the previous calendar year.

The production of oysters declined 15 percent during 1945 as compared with 1944 totals, but hard crabs and crabmeat showed considerable gain.

Pacific

SEATTLE RECEIPTS: During December, landings and receipts of fresh and frozen fishery products at Seattle totaled 5,319,000 pounds, 79 percent above the December 1944 production, according to the Service's Market News Office in that city. Receipts of frozen halibut and salmon from Alaska accounted for the major portion of the total.

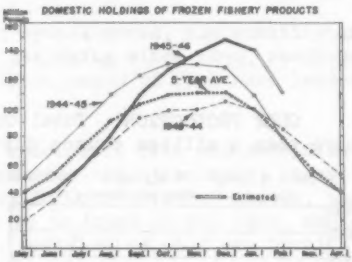
Nearly 90 million pounds of fresh and frozen fishery products were received during 1945, which represented an increase of about 32 percent over the 1944 figure. With the exception of lingcod, sablefish, sole and livers, the receipts of practically all other major species during 1945 showed sizable gains over 1944, with true cod, rockfish, smelt, and salmon making the largest percentage gains. The run of pink salmon in Puget Sound was one of the most important factors in the year's high production.



The 1945 receipts were the largest recorded since the Fish and Wildlife Service began collecting statistics for Seattle in 1939. The largest recorded total prior to 1945 was 80,909,000 pounds received in 1943, the year of all-out production for the war.

United States

COLD-STORAGE HOLDINGS: Holdings of frozen fish and shellfish declined 8 million pounds during December and on January 1, totaled 140,208,000 pounds, according to the Service's Current Fishery Statistics No. 241. This was 30 million pounds above the holdings on January 1, 1945, and 41 million pounds more than the 5-year average for this date.



Items which accounted for the major portion of the increase were groundfish and rosefish fillets, salmon, whiting, and lake herring. Holdings of these items showed the following increases compared with January 1, 1945: Groundfish and rosefish fillets, 6,700,000 pounds; salmon, 6,992,000 pounds; whiting, 5,400,000 pounds; and lake herring, 3,102,000 pounds.

Although fish-liver oils have long been recognized as first-class sources of vitamins A and D, it is less widely known that the flesh of fish is also a source of several vitamins. On the average, daily vitamin requirements could be obtained from ordinary serving portions of fish to the following extent: vitamin A, 10 percent; vitamin D, more than adequate amounts; thiamin (vitamin B_1), 15 percent; riboflavin (vitamin B_2), and nicotinic acid (another element of the vitamin B complex), 70 percent.

--Conservation Bulletin No. 38.

CANNED AND CURED FISH

Pilchard

PILCHARD PACK: During December, landings of pilchards at California ports continued to lag behind those of the 1944-45 season, with a decline of 47,432 tons under the December 1944 figure, according to reports from the California Sardine Products Institute and the California Division of Fish and Game. The pack of canned pilchards from December 2 through the 29th amounted to 329,663 standard cases compared with 629,141 standard cases for the corresponding period in 1944. The season's pack from August 1 to December 29 rose to 3,170,756 standard cases, 4 percent above the 1944-45 figure to December 30.

California Sardine Landings, Canned Pack and Byproducts

Item	Unit	MONTH 1945 Dec.2-29	MONTH 1945 Oct.28-Dec.1	MONTH 1944 Dec.3-30	SEASON 1945-46 Aug.1-Dec.29	SEASON 1944-45 Aug.1-Dec.30
Landings	Tons	27,411	79,182	74,843	351,125	485,382
Canned	1 lb.ovals-48 per case	77,884	249,059	193,159	1,003,460	1,185,899
	1 lb.talls-48 per case	241,907	659,657	408,481	2,031,843	1,717,259
	½ lb.fillet-48 per case	-	-	354	-	4,327
	½ lb.round-96 per case	9,228	14,824	13,678	43,848	51,688
	Unclassified	644	9,372	13,646	91,605	84,813
	TOTAL, Std. 1 lb.-48 per case	329,663	932,912	629,141	3,170,756	3,041,922
		December	November	December	Aug.-Dec.	Aug.-Dec.
Meal	Tons	5,086	8,816	11,593	50,798	74,711
Oil	Gallons	609,112	1,403,751	1,749,234	10,805,320	16,735,172

Shrimp

SHRIMP PACK: Since shrimp supplies continued to be absorbed by fresh markets, canning operations remained greatly curtailed, according to reports of the U. S. Food and Drug Administration received from plants served by its Seafood Inspection Service. From December 2, 1945, to January 5, 1946, 15,551 standard cases of shrimp were packed, raising the season's total to 116,867 standard cases, 70 percent below the 1944-45 figure to January 6.

Wet and Dry Pack Shrimp in all Sizes in Tin and Glass--Standard Cases*

MONTH 1945-46 Dec.2-Jan.5	MONTH 1945 Nov.4-Dec.1	MONTH 1944-45 Dec.3-Jan.6	SEASON 1945-46 July 1-Jan.5	SEASON 1944-45 July 1-Jan.6	5-yr.-average July 1-Jan.4
15,551	15,767	22,041	116,867	387,850	505,944

*All figures on basis of new standard case--48 No. 1 cans with 7 oz. per can in the wet pack and 6½ oz. per can in the dry pack.

Tuna

TUNA PACK: The production of canned tuna by California packers during December totaled 274,327 standard cases, according to the California Division of Fish and Game. This was one percent less than the November pack, but exceeded the production in December 1944 by 57 percent. The total pack for the year 1945 amounted to 3,546,658 cases, 22 percent greater than 1944.

The pack of mackerel by California packers during December was 145,153 standard cases, 20 percent less than November and 5 percent under December 1944. The 12-month pack of 635,889 cases was 36 percent below the pack in 1944.

California Pack of Tuna and Mackerel--Standard Cases*

Item	December 1945	November 1945	December 1944	Twelve mos. ending with December-- 1945	1944
	Cases	Cases	Cases	Cases	Cases
Tuna:					
Albacore	28	9,508	11,543	473,652	445,938
Bonito	2,668	9,351	2,387	49,379	8,496
Bluefin	1	557	732	265,052	367,736
Striped	65,153	86,794	29,787	537,026	362,917
Yellowfin	177,906	126,302	91,188	1,457,630	908,870
Yellowtail	2,396	3,161	237	16,203	19,867
Flakes	26,175	40,901	38,893	731,518	789,122
Tonno style	-	-	-	16,198	15,365
Total	274,327	276,574	174,767	3,546,658	2,918,311
Mackerel	145,153	181,485	152,145	635,889	986,192

*Standard cases of tuna represent cases of 48 7-ounce cans, while those of mackerel represent cases of 48 1-pound cans.

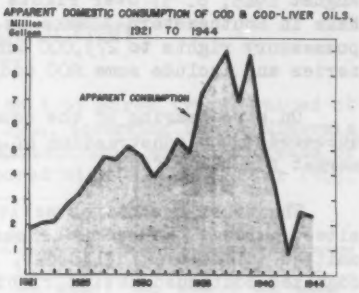
REGIONAL OFFICES
FISH AND WILDLIFE SERVICE

Address	In Charge
Portland 14, Oregon, 600 Weatherly Building.	Leo L. Laythe, Regional Director A. Kemmerich, Assistant
Albuquerque, New Mexico, P. O. Box 1306, 220 W. Copper Ave.	John C. Gatlin, Regional Director T. S. Kibbe, Assistant
Minneapolis 2, Minnesota, 828 Plymouth Building.	Oscar Johnson, Regional Director D. H. Janzen, Assistant
Atlanta 3, Georgia, 310 Glenn Building.	James Silver, Regional Director Roy Moore, Assistant
Boston 11, Massachusetts, 1105 Blake Building, 59 Temple Place.	John Pearce, Regional Director E. W. Bailey, Assistant

FISHERY BYPRODUCTS

Oil and Meal

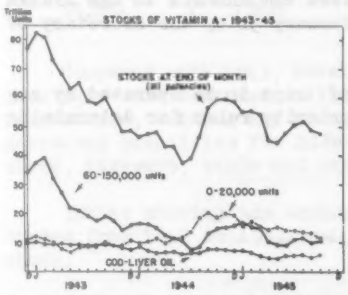
UNITED STATES PRODUCTION: The apparent consumption of cod and cod-liver oils in the United States rose from less than 2 million gallons in 1921 to nearly 9 million gallons in 1937. As a result of reduced imports, consumption fell sharply during the war. Imports during the five years 1935-39 averaged 8,372,658 gallons compared with the average of 2,171,937 gallons during 1940-44. Principal sources of imports were Norway, Germany, United Kingdom, and Iceland.



The production of fish oils during September totaled 4,897,214 gallons, bringing the total for the first ten months of 1945 to 18,951,385 gallons, according to the Service's Current Fishery Statistics No. 236. Although complete data are not available on meal and scrap production, items which accounted for 94 percent of the total 1944 production showed an output of 25,447 tons during October and 144,368 tons during the first ten months of 1945.

Vitamin A

STOCKS AND PRODUCTION: Stocks of vitamin A in fish-liver oils on October 31, were reported at 47.7 trillion units, a decrease of 2 percent under stocks held on the first of the month and 20 percent less than those of October 31, 1944, according to the Service's Current Fishery Statistics No. 238.



Production of vitamin A during October, totaled 5.8 trillion units compared with 8.4 trillion units produced during October 1944. Total production during the first ten months of 1945 amounted to 52.3 trillion units compared with 63.6 trillion units for the corresponding period of 1944.

Receipts of livers during October totaled 901,666 pounds, containing about 3.8 trillion units of vitamin A. During the same month of 1944, 1,445,945 pounds of livers, having a vitamin A content of 5.8 trillion units, were received.

OTHER NOTES ON FISHERY MARKETING

Alaska Fishery Rights

Secretary of the Interior Harold L. Ickes, on January 17, brought to a conclusion the long standing controversy (Fishery Market News, May 1945, p. 9 and August 1945, p. 5) over rights of the native villages of Hydaburg, Klawack, and Kake in Southeastern Alaska by modifying his previous order recognizing native possessory rights to 273,000 acres. The modifications exclude areas used for canneries and include some 800 additional acres.

On a re-hearing of the case, cannery owners showed that the natives had acquiesced in the construction of canneries which provided the natives with a ready market for their fish.

The order recognizes native rights to various traditional cemeteries, home sites, gardens, and smokehouses which the natives claimed had been improperly omitted in the original order. The Secretary's order of July 27, 1945, had recognized continued native rights in 273,000 acres of land. The natives of the three villages had claimed a total of 3,329,000 acres.

The Secretary's decision in the case was based upon findings rendered by Richard H. Hanna, former Chief Justice of the Supreme Court of New Mexico. Extensive hearings were held in Alaska and Seattle from September to November, 1944, in which more than 2,700 pages of testimony were taken.

Alaska Fishery Hearings

Notice of a hearing on February 21, on proposed amendments to the Alaska Commercial Fishing Regulation for 1946, was issued January 31 by the Secretary of the Interior, Harold L. Ickes.

The proposed amendments would limit the number of traps to be operated by any one individual or organization and would establish priority rules for determining rights to hold War Department trap permits.

Unemployment Insurance Laws

The Fish and Wildlife Service is presenting, in a series of fishery leaflets compiled by the Economics and Cooperative Marketing Section, Division of Commercial Fisheries, a digest of "Unemployment Insurance Laws" with specific application to fishermen and allied workers throughout the United States. This digest is an interpretation by the Service of the existing laws and is subject to correction by courts or administrative agencies. Each leaflet applies to fishermen and allied workers in a different area of the United States, as follows:

FL-149 - Chesapeake Bay States
FL-150 - Middle Atlantic States
FL-151 - New England States
FL-152 - South Atlantic States
FL-153 - Pacific Coast States
FL-154 - Gulf States
FL-171 - Great Lakes States

United States Salt Production

A record of 15,717,171 short tons of common salt of three types, valued at $45,989,264, were produced in the United States in 1944, according to the Minerals Yearbook--1944, published by the U. S. Bureau of Mines. This was an increase of 3 percent in quantity and 5 percent in value compared with the totals for 1943.

Salt Sold or Used by Producers in the United States, 1942-44

	1942	1943	1944
Total for all uses and purposes:	Sh. tons	Sh. tons	Sh. tons
Evaporated salt	3,517,832	3,993,899	3,942,621
Rock salt	2,802,287	3,259,138	3,448,238
Used in fish curing:			
Evaporated salt	28,908	32,724	35,998
Rock salt	32,007	53,463	67,844
Total	60,915	86,187	103,842

Among the many uses of the three categories of salt--evaporated, rock salt, salt content of brine--is chemical manufacture, which requires the largest part of total salt. It consumes all the salt of brine and about 35 percent of the dry salt produced.

Imports of Salt for Use in Curing Fish

1935-39 Av.	1941	1942	1943	1944
Sh. tons	Sh. tons	Sh. tons	Sh. tons	Sh. tons
21,250	7,426	6,434	-	-

Compared with 1943, considerably increased quantities of both evaporated and rock salt were consumed in 1944 for chlorine, soap precipitant, fish curing, refrigeration, canning and preserving, other food processing, and "other" uses, and decreased quantities for hides and leather, meat packing, dairy products, livestock, highways, table and other household, water treatment, and metallurgy.

Tables showing the amount of salt sold or used by producers in the United States from 1942 to 1944 and imports of salt for use in curing fish are shown above.

Purchases of Fish by Department of Agriculture

November 1945 purchases of fishery products by the United States Department of Agriculture showed a gain of $281,494 as compared with October. The greatest increases in purchases were reflected in canned pilchards and canned salmon.

Purchases of Fishery Products by USDA

Commodity	Unit	November 1945		January-November 1945	
		Quantity	F.O.B. Cost	Quantity	F.O.B. Cost
FISH AND SHELLFISH			Dollars		Dollars
Herring, canned	Cases	5,741	27,415	80,802	429,379
Mackerel, "	"	56,296	274,160	272,278	1,437,715
Pilchards, "	"	394,465	1,483,468	1,635,846	6,413,741
Salmon, "	"	236,440	1,982,250	1,617,228	15,908,790
Sardines, "	"	71,482	320,984	1,435,120	5,775,986
Squid, "	"	-	-	307,500	1,491,375
Tuna and tuna-like fish, "	"	-	-	53,828	569,932
Fish, flaked, "	"	-	-	20,267	205,986
Fish, ground, "	"	-	-	125,887	365,506
Total .... "	"	764,424	4,088,277	5,548,756	32,598,410
Fish, brine-cured	Pounds	-	-	40,000	8,000
" , dry-salted	"	-	-	20,309,570	3,259,100
" , smoked	"	-	-	1,531,600	162,123
Total	"	-	-	21,881,170	3,429,223
BYPRODUCTS					
Feeding oil	"	-	-	41,000	15,990
Fish meal	"	-	-	2,880,000	115,125
Oyster shell	"	-	-	160,000	640
Oyster shell flour	"	-	-	320,000	1,120
Oyster shell grits	"	-	-	440,000	1,604
Total	"			3,841,000	134,479
VITAMINS					
Vitamin A fish-liver oil	M Units	-	-	14,502,262	3,902,447
Grand Total		-	4,088,277	-	40,064,559

Wholesale and Retail Prices

Wholesale and retail prices for all foods advanced 1.0 and 0.9 percent, respectively, from mid-November to mid-December, according to reports of the Bureau of Labor Statistics, Department of Labor. These gains were accompanied by small rises in the average retail prices for fresh and canned and fresh and frozen fish, also canned pink and red salmon. Both wholesale and retail prices showed considerable increases over those at mid-December 1944.

Wholesale and Retail Prices

Item	Unit		Percentage change from-	
Wholesale: (1926 = 100)		Dec.15,1945	Nov.17,1945	Dec.16,1944
All commodities	Index No.	106.7	+0.4	+2.2
Foods	do	108.3	+1.0	+2.5
Fish:		Dec. 1945	Nov. 1945	Dec. 1944
Canned salmon, Seattle:				
Pink, No. 1, Tall	$ per dozen cans	1.970	0	0
Red, No. 1, Tall	do	3.694	0	0
Cod, cured, large shore, Gloucester, Mass.	$ per 100 pounds	13.50	0	0
Herring, pickled, N. Y.	¢ per pound	12.0	0	0
Salmon, Alaska, smoked, N. Y.	do	35.0	0	0
Retail: (1935-39 = 100)		Dec.11,1945	Nov.13,1945	Dec.12,1944
All foods	Index No.	141.4	+0.9	+2.9
Fish:				
Fresh and canned	do	221.7	+0.4	+5.1
Fresh and frozen	¢ per pound	34.4	+0.5	+5.8
Canned salmon:				
Pink	¢ per pound can	23.2	+0.9	+3.1
Red	do	40.9	+1.2	+1.2

FOREIGN FISHERY TRADE

Imports and Exports

GROUNDFISH IMPORTS: Fresh and frozen groundfish imports, under the tariff classification "fish, fresh or frozen fillets, steaks, etc., of cod, haddock, hake, cusk, pollock, and rosefish," amounted to 3,175,144 pounds in December, reaching a total of 41,313,204 pounds for the year 1945, as reported by the Bureau of Customs, Treasury Department. The year's reduced tariff quota was 17,668,311 pounds, and all imports exceeding this figure have been subject to the full tariff rate of 2½ cents per pound.

Commodity	Dec.1-29,1945	Nov.4-30,1945	Dec. 1944	Jan.-Dec.1945	Jan.-Dec.1944
Fish, fresh or frozen, fillets, steaks, etc., of cod, haddock, hake, cusk, pollock, and rosefish	3,175,144	2,724,035	1,634,616	41,313,204	23,683,431

Canada

VITAMIN OIL, BRITISH COLUMBIA: Production of vitamin oil in British Columbia during 1944 amounted to 5,000,000 pounds, having a value of more than $4,500,000, according to a report received by the State Department from the American Consulate General at Vancouver, British Columbia, Canada.

An abstract of the report follows:

Thirteen years ago, the livers handled in British Columbia for their vitamin oil content were halibut, lingcod, black cod, and red cod. While these four species are still being caught in much larger quantities than a decade ago, discoveries made by science in regard to the vitamin content of fish livers have greatly widened the field, and now dogfish, gray cod, soupfin sharks, mud sharks, skates, and salmon are being landed in large volume for their vitamin content as well as their food value.

Dogfish landings in British Columbia during 1944, valued at $3,751,460, were only exceeded in point of value that year by salmon and herring. Dogfish livers have an oil content of from 65 to 75 percent and a vitamin A potency of from 3,000 to 30,000 units per gram.

The annual catch of halibut by fishermen of British Columbia is approximately 12,000,000 pounds. In 1944, Canadian landings of Pacific halibut amounted to 13,167,100 pounds, valued at $2,231,794. The quantity of halibut livers taken that year was 217,700 pounds, valued at $143,057. Production of vitamin oil from livers was 27,207 pounds, valued at $146,915, and the production of vitamin oil from viscera amounted to 22,781 pounds, valued at $86,197.

Production of vitamin oil from livers of black cod in 1944 amounted to 7,891 pounds, valued at $57,776, and production of vitamin oils from the fish viscera totaled 4,099 pounds, valued at $18,920.

The total catch of salmon in British Columbia during 1944 was 107,571,900 pounds, valued at $15,623,223. Although the greater part of the salmon catch is used by the canning plants, some salmon livers are used for making vitamin oil. In 1944, 1,264 pounds of vitamin oil, valued at $566, were produced.

In 1944, production of soupfin shark liver vitamin oil amounted to 34,690 pounds, valued at $288,436, and production of mud shark liver vitamin oil was 80,828 pounds, valued at $28,650. In addition, there was a small production of mixed shark liver vitamin oil amounting to 9,683 pounds, valued at $5,982.

The catch of lingcod in the waters off British Columbia is quite a substantial one, amounting to 8,425,000 pounds in 1944, from which 20,025 pounds of vitamin liver oil, worth $310,295, and 11,462 pounds of vitamin viscera oil, valued at $8,283, were produced.

Vitamin A oils having a potency range up to 40,000 U.S.P. units are considered low potency oils in Canada and those vitamin A oils having a potency above 40,000 U.S.P. are considered high potency oils.

While it would appear that the production of vitamin oils from dogfish livers should show a substantial decrease as a result of over-fishing during the war years, it is anticipated that Government control of high potency vitamin oils will be removed, enabling American buyers to procure a portion of their requirements in this market.

A recapitulation of production figures is given below, showing the production of vitamin oils in British Columbia during 1944:

	Pounds	Value
Cod liver oil	3,794	786
Halibut liver oil	27,207	146,915
Halibut visceral oil	22,781	86,197
Salmon oil	1,264	566
Black cod liver oil	7,891	57,776
Black cod visceral oil	4,099	18,920
Lingcod cod liver oil	20,025	310,295
Lingcod visceral oil	11,462	8,283
Red and Rock cod liver oil	2,566	27,166
Red and Rock cod visceral oil	412	268
Grayfish liver oil	4,909,808	3,661,121
Soupfin shark liver oil	34,690	288,436
Mud Shark liver oil	80,828	28,650
Mixed shark liver oil	9,683	5,982
Total	5,136,510	4,641,371

COLD STORAGE: Freezings of fishery products in Canada's freezers in December totaled 5,590,000 pounds, according to reports of the Department of Trade and Commerce of the Dominion Bureau of Statistics. On January 1, there were 28,148,000 pounds of fishery products held in cold storage. The holdings on January 1 were almost identical to those of a year previous, and were about 5 million pounds under those of December 1, 1945.

Mexico

FISHERIES IN 1945: The most striking development in the Mexican fisheries during 1945, according to M. J. Lindner, Fish and Wildlife Service representative, was the decline in the production of shark livers due to a scarcity of sharks. Shark livers are utilized primarily for the extraction of vitamin A. From a high of approximately 20 trillion units of vitamin A production in 1942, the Mexican livers dropped to about 9 trillion units during 1945. This decrease in production resulted in the withdrawing, by a majority of the United States concerns, of

their local purchasing representatives. Many of the Mexican fishermen now are no longer finding it profitable to fish for sharks, and unless there is a sudden unforeseen increase in the shark population, the 1946 catch will be lower than that of 1945.

Since 1942, regardless of a steadily increasing fishing intensity, the production of shark livers has continued to decline due to an apparent decrease in the abundance of the sharks. The return to the individual shark fisherman has reached such a low level that many are now turning their efforts to other fishes. This decrease in sharks has probably been caused by over-fishing.

Guaymas, Sonora, is rapidly outstripping all other Mexican ports as the most important fishing town in Mexico. Guaymas now has three quick-freezing plants, two of which were completed during 1945; one fish-liver extraction plant; one cannery, which was remodeled in 1945; and a shark-hide tannery that is under construction. The most important fishery product of this port is frozen headless shrimp, followed by such items as totuava or white sea bass, shark livers, cabrilla, oysters, and Spanish mackerel. With the exception of the oysters and Spanish mackerel canned for domestic consumption, practically the entire production is exported to the United States.

In addition to the freezing plants mentioned at Guaymas, there is one at Topolobampo, Sinaloa, another under construction near Guaymúchil, Sinaloa, and a small one in construction at Mazatlán, Sinaloa. These plants are primarily dedicated to shrimp, but undoubtedly will process other fishery products as well.

A modern fish-liver, vitamin-extraction plant is nearing completion in Guadalajara, Jalisco.

The shrimp fleet in the Gulf of California has continued to increase, and there are now over 100 trawl boats operating between Guaymas, Sonora and Altata, Sinaloa.

The exportation of fresh fish to the United States through Laredo and Brownsville, Texas, amounted to over four million and a half pounds during 1945. In spite of the easing of meat rationing in the United States, the shipments during the period September 1 to December 31, 1945, showed an increase of over 25 percent above that for the corresponding period in 1944. These shipments normally are lowest during the winter holiday season and highest during Lent.

Norway

TRAWL FISHING: The State Department has received information from the United States Embassy at Oslo, Norway, to the effect that the trawl fishing law in Norway, which became effective March 17, 1939, is being contested.

Outstanding provisions of the law are set forth as follows:

1. It is forbidden to carry on trawl fishing in Norwegian territorial waters.

2. It is forbidden to bring ashore in Norway fish caught by foreign trawl vessels or to load the catch from one vessel to another in a Norwegian harbor or such fish brought in from the fishing banks. Likewise, foreign trawlers are forbidden to seek shelter on the Norwegian Coast or to transfer fish from one vessel to another.

3. As long as a fishing vessel with trawler equipment is in Norwegian territorial waters outside of a harbor, the whole fishing equipment shall be stowed away in the ship.

4. Vessels which come to the fishing banks where other boats are already carrying on fishing shall not set up their own fishing equipment so near other vessels and their equipment that they, in an unreasonable way, prevent the other vessels from carrying on their activities.

5. Fishermen fishing with trawl equipment shall take care that they do not cause damage to the nets, and other fishing equipment of other fishermen.

6. When vessels are fishing with nets or lines, vessels carrying on fishing with trawl equipment shall not come nearer to them than a nautical mile.

7. When vessels fishing with trawl equipment come near places marked by nets or lines during the day or in the night by lights which show where these lines and nets are, and which have been left there by fishermen, then the trawler shall not carry on operations nearer than a nautical mile from such marks or lights and shall in no case carry on fishing between two such marks or lights.

8. Inspection ships shall, where conditions allow it, call the attention of trawlers to nets or lines which have been set out in the sea where they are situated.

9. If any injury is done to such nets or lines, trawling vessels which have been fishing in the vicinity will have to furnish proof in a court that the injury has not been caused by them, excepting circumstances where proof is unnecessary.

10. Before a trawler vessel begins its fishing operation, it shall make its position known by putting out a buoy showing the directions. The trawlers must not fish farther away from such a buoy than one nautical mile when there are fishermen's nets and lines on the banks.

11. The King can decide that the use of trawl vessels shall be forbidden all year around or at a certain time of the year in certain parts of the fishing banks.

12. The one who breaks this law or regulation or who takes part in such an action is punished with fines up to 20,000 kroner.

13. The King can give the captain of a vessel of inspection authority to fine persons for breaking par. 3 and 8 of this law and par. 10 and the rules in ... the criminal law which deals with regulations to prevent collision by the ships or with reference to SOS signals or unloading the catch.

14. If the misdemeanor has been committed by a member of the crew and the responsibility for this action can be placed on the shoulders of the captain of the ship then the member of the crew who committed the actual act shall not be punished.

15. The regulations in this law shall not affect the use of shrimp trawlers.

16. The regulations in this law shall not affect research work in the fisheries which is being carried on by the State.

17. The stipulations in this law do not affect the use of shrimp trawlers. However, the stipulation in par. 3 about stowing away the equipment under certain circumstances also pertains to shrimp trawlers if the shrimp trawler is of that class that it comes in under the law which does not allow its use inside territorial waters.

18. This law goes into force April 1, 1939, because we have sanctioned this law under our hand and seal given at Oslo Palace, 17 March 1939.

At a recent convention of the Oslo Association of Civil Engineers, an address was made by Mr. Jan L. Backer in behalf of trawl fishing. Mr. Backer of Kristiansund is engaged in the operation of a fleet of trawlers and in the marketing of fish; in addition he has interests in the lumber business.

His address is in part as follows:

"We are carrying on our cod fishing by methods 2,000 years old.

"During the 90's of the last century, a new method of fishing was introduced; namely, by the trawler. In 1900, Great Britain had 1,100 steam trawlers and in France, Belgium, the Netherlands, and Germany we find the same development.

"The fishing nations of northern Europe have, by means of the trawler, increased their total catch from 2½ million tons in 1910 to 3½ million tons in the years before the last World War, but Norway's share in this catch has, during this period, gone down from 47 percent in 1914 to 28 percent in 1932. It is true that Norway has also increased and modernized her fishing fleet in this period, but she has followed the old methods of fishing by line and net which has been known for over 2,000 years and has not, therefore, gone over to the new method of fishing out on the open ocean with trawlers.

"In the 10-year period--from 1930 to 1939--the Norwegian fisheries amounted to one million tons of fish per year, including herring, and it had a value of 80 million kroner. Of this amount, the cod fisheries amounted to 22 million kroner or 27 percent of our total catch.

"Trawler fishing is almost entirely devoted to catching cod."

The speaker than spoke of the attempt that had been made in his country to carry on fishing with trawlers.

"The first attempt was made at Stavanger at the beginning of the century. In 1936, Norway had 8 trawlers--Kristiansund had most of them. The fishing showed good results, but then we got the temporary trawler law of 1937 and the permanent law of 1939 which put a stop to this development in our country."

According to the speaker, the situation in Norway is this:

"The Norwegian fishermen wait for the fish to come up to the coast on the different fishing banks along the coasts, but the foreigners to after the fish, going long distances from shore in their big trawlers where they can catch the fish at all times of the year, while in Norway the fishing is divided into seasons; i.e., limited to those periods when the fish come within Norway's territorial waters along the coasts. For that reason, there is a big difference between the catching of fish in Norway and these other fishing nations, and the results are accordingly.

"In the Norwegian fisheries, there are almost as many boats as men. This puts the Norwegian fisheries on a very individualistic basis, but it isn't a modern system, because it limits the fishing to the coast and the fish cannot be sought out on the open ocean where they are to be found at all times of the year. It is too risky to go out there with small sailing vessels or small motorboats."

The speaker rejected the theory that fishing with trawlers is injurious to the fish in any way; namely, that the trawlers destroy the food of the fish and the fry.

"Trawler fishing will not take bread away from our fishermen nor does it have to create unemployment, but, on the other hand, it will secure for our fishermen a larger income. The fishermen can carry on their catch the entire year and not only during short seasons. It is an actual fact that the ordinary coast fishing brings a loss both to the fishermen themselves and to the State which must give large subsidies at the present time. In spite of these subsidies, Norwegian fishing has become too high on account of the obsolete methods of catch and cannot, therefore, compete as it should on the world market. For years, we have had a crisis in our cod fishing and this will become chronic and permanent if something is not done to remedy the matter.

"Other countries have increased and extended their production of fish while ours has stagnated, it does not only hurt our fishermen, but also to a high degree, the many workers on land whose vocations are closely connected with the cod fisheries.

"Taking Norway's share of the fisheries of the far northern waters, like around Bear Island, the Barentz Sea and the West Coast, it has gone down from 84 percent in 1925 to 34 percent in 1936, while the British, German, and Iceland catch has gone up accordingly. It is at our expense that Iceland and others by their better technique and effective rationalization have become more successful year by year. Thanks to her cheaper means of production, better methods and better boats, Iceland has conquered our old markets. We must look that fact in the eye that our coast fisheries have really ceased to become a paying proposition for the great majority participating therein."

Another speaker spoke about Norway's trawler laws, which he criticized very sharply. He pointed to their unreasonable stipulations which make it possible for foreigners to fish along the Norwegian Coast outside territorial waters with trawlers while Norwegians are forbidden to do so. Mr. Backer, however, pointed out that the Norwegian trawler fishermen did not seek to get fish inside of Norwegian territorial waters to the exclusion or disadvantage of foreigners. It was his opinion that fishing inside of territorial waters along the coast could be left to the fishermen who wish to carry on the catch in the old way if they found that it paid them at all.

Uruguay

EXPANSION OF FISHERIES: The State Department recently announced the passage of two laws, effective October 26, 1945, by the Government of Uruguay, relative to the reorganization of the "Servicio Oceanografico y de Pesca" (S.O.Y.P.) as a decentralized service under the Ministry of Industries and Labor, in accordance with information received from the United States Embassy at Montevideo, Uruguay.

One of the laws establishes a regime for the Servicio as a special decentralized service under the Ministry of Industries and Labor, and the other provides for the financing of the regime by means of the issuance of internal debt bonds in the amount of five million pesos.

Under the Decree, the agency will undertake the following tasks:

1. To develop fishing in the ocean, the rivers and the fiscal lakes of the country.

2. To industrialize all the products of such fishing when it believes it expedient.

3. To sell and develop the products and byproducts of fishing, either in their natural state or after their elaboration.

4. To establish ice factories to meet its own needs, being empowered to sell any surplus to the public.

5. To establish freezing chambers for the preservation of its products and for rental to private individuals.

6. To encourage and favor the creation of fishermen's colonies and cooperatives, as well as any private activity with marine fishing as an objective.

7. To establish oceanographic museums, biological, chemical, and oceanographic laboratories, and, in general, to promote all scientific activity, the object of which is the study of marine flora and fauna and other branches of oceanography.

8. To provide Uruguayan rivers, streams, and lakes with the most suitable species and with those giving the most remunerative return; and to establish oyster beds and other mollusk beds in general.

9. To exercise sanitary control over the sale of fish and fish products, either fresh or manufactured, as also over its domestic manufacture and other similar imports from abroad.

10. To enforce all legal dispositions and all regulations connected with fisheries, without prejudice to such intervention as may correspond to the municipal and national authorities.

Two points in the law which sets up the regime are worthy of special mention. First, Article 20 permits the contracting of foreign personnel for technical work, although employment of personnel on board the organization's boats must be in accordance with the law governing the national coasting trade. Second, Article 23 provides that any private fishing enterprise, if it feels that the S.O.Y.P. is obstructing its activities or prejudicing free competition, may make an appeal to the executive power.

This law is similar in nature, but more elaborate in detail, to a draft law proposed several years ago. Although that project law was presented to the General Assembly, it never was passed, and, until the present time, no legislative action was taken to strengthen the existing Fisheries Service.

It is believed that this reorganized state undertaking may provide the population of Uruguay with an important additional source of food which, to date, has figured very little in the national diet, and, by so doing, may benefit indirectly the national economy.

MAN'S QUEST FOR FOOD: The need of more food to feed an ever-increasing population has brought a large part of the arable lands of the world under cultivation. Forests have been leveled, swamps drained, and deserts irrigated. Experiments are even being made in soilless agriculture. Concurrently, fishing frontiers have been pushed farther and farther out to sea and along the coast lines of the world. Now many species of fish are pursued over thousands of miles of ocean--throughout their range of distribution, in fact. In expanding these frontiers, species new to the commercial world have been found in abundance and exploited.

For several centuries after the Renaissance, fishing and farming advanced at more or less comparable rates. When the Hanseatic League was flourishing, the world saw the rise of the great herring and other fisheries in the Atlantic off Western Europe and the rapid increase in agricultural production in Central Europe. During the colonial period in North America also, fishing and farming marched along at comparable rates. But in more recent times, especially since the middle of the nineteenth century, agriculture in North America has far out-distanced the fishery industry. In general, this has also been true throughout the rest of the world. As long as more land could be brought into production, less and less consideration was given to the sea as a source of food. Recently, however, the trend has reversed, and greater attention is being given to exploring fishery resources and tapping their vast stores of animal protein food. If this trend continues at its present rate, the seven seas will be combed for food fish as they were for whales in the first half of the nineteenth century by the ships from Nantucket and New Bedford.

NOTE: This article is based on "La pesca y las industrias pesqueras en el Perú," a report of the United States Fishery Mission to Peru in 1941.

FEDERAL LEGISLATION, DECISIONS, ORDERS, ETC.

Office of Price Administration

PRICE CONTROLS RELAXED: A group of 24 miscellaneous commodities, mostly minor food items, were exempted from price control on January 28, the Office of Price Administration announced on January 23.

The action also extended until March 30, 1946, the existing suspension of price ceilings on fresh, frozen, and canned crabmeat. The suspension of controls for these items would have expired January 29, 1946, in the absence of the new amendment.

The 24 commodities were being exempted under provisions of the recent directive dealing with the removal and suspension of price ceilings, OPA said. The items included the following fishery products:

Imported and domestic canned eels, frozen clams, frozen oysters.

Amendment 15 to Supplementary Order 132--Exemption and Suspension from Price Control of Certain Foods, Grains and Cereals, Feeds, Tobacco and Tobacco Products, Agricultural Chemicals, Insecticides and Beverages--became effective January 28, 1946.

NORWEGIAN SARDINES: Maximum prices have been established for importers' sales of Norwegian Brisling sardines packed in refined herring oil, the Office of Price Administration announced on January 30, in issuing Order 362 to Order 38 under the Maximum Import Price Regulation, effective February 5.

This canned fish product is again available to United States buyers, and numerous importers have requested authorization of individual ceiling prices, OPA stated. The new prices, applicable to all importers, will relieve both OPA and importers from the burden of handling individual applications for ceiling prices, the agency added.

Sales by importers to—	Per case of 100 3¾ ounce—Norwegian Brisling sardines	
	Aluminum containers	Tin containers
Wholesalers and chain stores	$17.37	$16.43
Independent retailers	18.39	17.30
Industrial and institutional users	19.06	18.03

The prices, (subject to adjustment for duty) ex-dock or warehouse United States point of entry, duty paid are:

Retail ceiling prices for imported Norwegian Brisling sardines will be computed under other regulations, and will range from 21 to 26 cents a can, depending upon the location and classification of the retail stores.

RECENT FISHERY PUBLICATIONS

Listed below are informational publications which recently have been processed by the Division of Commercial Fisheries. With the exception of the FL series, these may be obtained, free of charge, from the Division of Commercial Fisheries, Fish and Wildlife Service, Washington 25, D. C. FL publications are available from the Fish and Wildlife Service, Merchandise Mart, Chicago 54, Illinois.

Number	Title
CFS-234	- Vitamin A Report, September 1945
CFS-235	- Frozen Fish, December 1945
CFS-236	- Fish Meal and Oil, October 1945
CFS-237	- New England Landings, Boston, Gloucester & Portland, Oct. 1945
CFS-239	- Current Fishery Trade - Monthly Summary, October 1945
CFS-240	- New England Landings, New Bedford, October 1945
CFS-241	- Frozen Fish, January 1946
SL-114	- Firms Canning Mussels, 1944
FL-149	- Unemployment Insurance Information for Fishermen and Allied Workers, Chesapeake Bay States
FL-150	- Unemployment Insurance Information for Fishermen and Allied Workers, Middle Atlantic States
FL-151	- Unemployment Insurance Information for Fishermen and Allied Workers, New England States
FL-152	- Unemployment Insurance Information for Fishermen and Allied Workers, South Atlantic States
FL-153	- Unemployment Insurance Information for Fishermen and Allied Workers, Pacific Coast States
FL-154	- Unemployment Insurance Information for Fishermen and Allied Workers, Gulf States
FL-167	- Fishing Vessels of New England and New York City, 1945
FL-171	- Unemployment Insurance Information for Fishermen and Allied Workers, Great Lakes States
FL-172	- Compliance with the Federal Food, Drug, and Cosmetic Act in the Marketing of Fishery Products
MDL-16 (Revised)	- North Dakota Cold-storage Locker Plants
MDL-28 (Revised)	- Vermont Frozen Food Locker Plants

Designations for fishery publications are interpreted as follows:

CFS - Current fishery statistics of the United States and Alaska.

SL - Statistical lists, consisting of lists of dealers of fishery products and manufacturers of byproducts.

FL - Fishery leaflets.

MDL - Market development lists of frozen food locker plants and locker associations.

Compositor: Jean Zalevsky

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EPARTMENT OF THE INTERIOR
FISH AND WILD LIFE SERVICE
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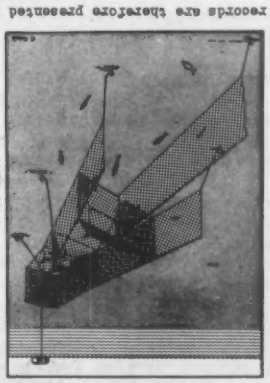
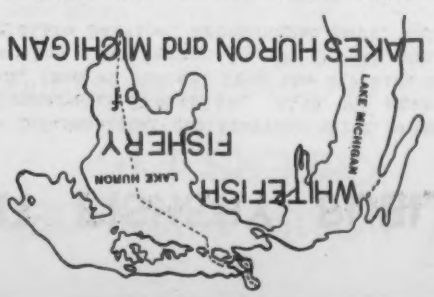
The Fish and Wildlife Service has just announced the publication of Fishery Bulletin No. 40, "The Whitefish Fishery of Lakes Huron and Michigan with Special Reference to the Deep-Trap-Net Fishery, by Drs. Van Oosten, Hile, and Jobes of the Division of Fishery Biology. An abstract follows:

"This study of the whitefish fishery of Lakes Huron and Michigan includes: (1) a review of the available statistics of production, 1879-1942; (2) a detailed analysis of the annual fluctuations in the production and abundance of whitefish and in the intensity of the whitefish fishery in the State of Michigan waters of the lakes, 1929-1942, with special reference to the effects of fishing with deep-trap-nets; (3) an account of the bathymetric distribution and vertical movements of whitefish and certain other species; and (4) a report of field observations made in 1931 and 1932, as related particularly to the destruction of undersized whitefish by pound nets and deep-trap-nets. The main body of the manuscript and appendices A, B, and C, completed in March 1942, contain statistics through the year 1939. Since that time, records for the years 1940-1942 have become available. Because these additional data did not alter any of the conclusions of the manuscript but actually strengthened them, it was not deemed justifiable to expend the considerable amount of time and money that would be required to revise the study. The 1940-1942 records are therefore presented in appendix D.



"From a relatively high production in the earlier years of the period, 1879 to 1942, the yield of whitefish declined to a lower level about which the catch fluctuated until the late 1920's and early 1930's when a general increase in production occurred. This recent increase was higher and the subsequent decline more severe in the Michigan waters of Lake Huron than in other areas."

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